

NATIONAL GEOGRAPHIC



THE FIRST PIONEER?

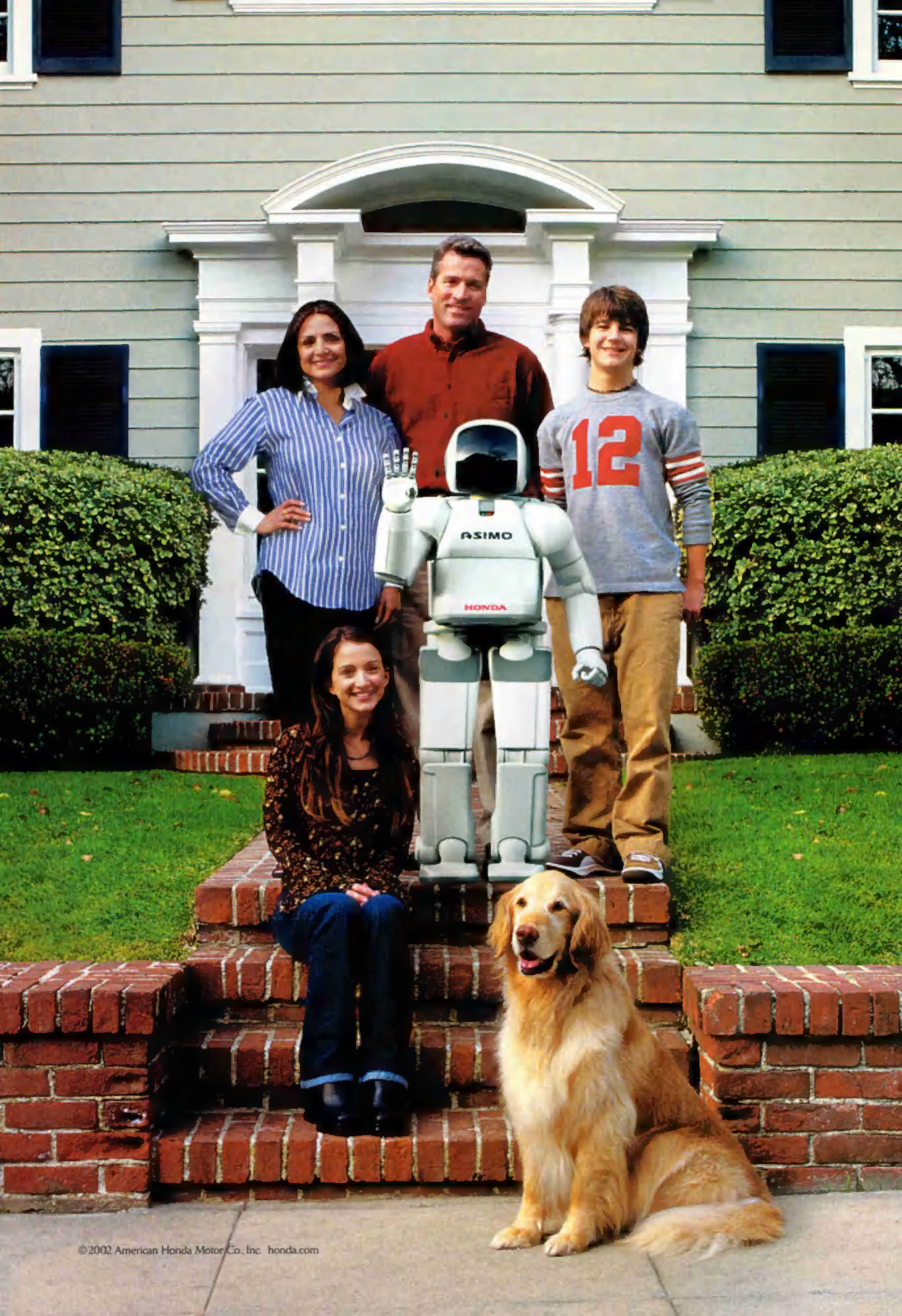
A new find
shakes the
human
family tree

South Africa's Teeming Seas Movable Feast 2

Mount Fuji Sacred Summit 26 **Henrietta Marie** Slave-Ship Wreck 46

Bahia Where Brazil Was Born 62 **Russian Smokejumpers** Into the Fire 82

Proboscis Monkeys Smelling Trouble 100 **ZipUSA: 03246** Bear Island, NH 118



We're building a dream, one robot at a time.

The dream was simple. Design a robot that, one day, could duplicate the complexities of human motion and actually help people.

An easy task? Hardly. But after more than 15 years of research and development, the result is ASIMO, an advanced robot with unprecedented human-like abilities.

ASIMO walks forward and backward, turns corners, and, amazingly, goes up and down stairs with ease. All with a remarkable sense of strength and balance.

The future of this exciting technology is even more promising. ASIMO has the potential to respond to simple voice commands, recognize faces, carry loads and even push wheeled objects. This means that, one day, ASIMO could be quite useful in some very important tasks. Like assisting the elderly, and even helping with household chores. In essence, ASIMO might serve as another set of eyes, ears and legs for all kinds of people in need.

All of this represents the steps we're taking to develop products that make our world a better place. And in ASIMO's case, it's a giant step in the right direction.

HONDA

The power of dreams.



GOODYEAR YEAR



OUR WRANGLERS ARE THE MOST POPULAR LIGHT TRUCK TIRE IN THE LOWER 48. GOODYEARTIRES.COM

52% of the vehicles sold last year

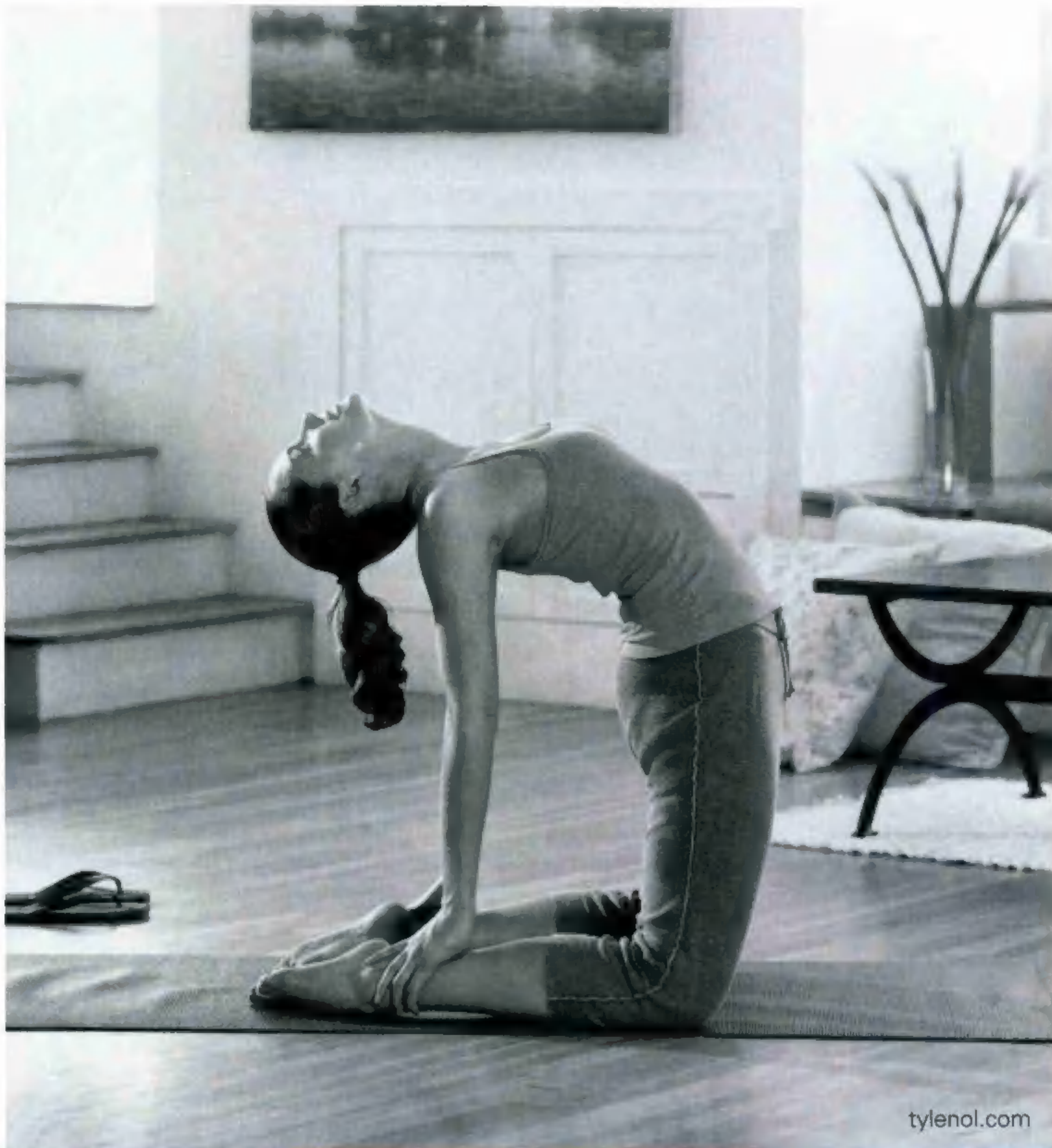
were light trucks.

God bless America.

Pickups. On the wings of Goodyear.

McNeil

© McNeil-PPC Inc. 2002. Use as directed.



tylenol.com

*This morning was brought to you
by a good night's sleep.*

A great night's sleep can do wonders. Get the rest you need with gentle, non-habit-forming Tylenol PM. It safely stops your pain, and helps ease you into a restful sleep. So the morning can be yours again.

For great mornings, take comfort in our strength.





Contents

New Find

This 1.75-million-year-old skull from the republic of Georgia might have belonged to one of the first humans to leave Africa. And it doesn't look anything like scientists thought it would.

PHOTOGRAPH BY GOURAM TSIBAKHASHVILI

FEATURES

- 2 Oceans of Plenty** In the greatest shoal on Earth, cold and warm waters surge together off South Africa to create rich marine ecosystems and a billion sardines on the move.
BY KENNEDY WARNE PHOTOGRAPHS BY DAVID DOUBILET
- 26 Mount Fuji** Japan's famous peak is: A) a serious volcano, B) the spiritual epicenter of a nation, or C) a tourism engine whose image is plastered on countless consumer goods. Answer: all of the above.
BY TRACY DAHLBY PHOTOGRAPHS BY KAREN KASMAUSKI
- 46 Henrietta Marie** The oldest slave ship ever excavated, wrecked off Florida in 1700, is yielding a multitude of artifacts—and blood-curdling history.
BY JENNIFER STEINBERG PHOTOGRAPHS BY COURTNEY PLATT
- 62 Bahia** An African rhythm drives this Brazilian coastal state, home to descendants of the first slaves brought to the New World.
BY CHARLES E. COBB, JR. PHOTOGRAPHS BY DAVID ALAN HARVEY
- 82 Russian Smokejumpers** Talk about tough: These guys throw themselves out of 50-year-old aircraft into burning Siberian forests.
BY GLENN HODGES PHOTOGRAPHS BY MARK THIESSEN
- 100 Proboscis Monkeys** Borneo's flamboyant primates are famous for having big noses. What you might not know about them is they're graceful, they can swim, and they're in trouble.
ARTICLE AND PHOTOGRAPHS BY TIM LAMAN
- 118 ZipUSA: 03246** On Bear Island, New Hampshire, boys have fleas and girls wear bras on their heads. It must be summer camp!
BY CATHY NEWMAN PHOTOGRAPHS BY PENNY DE LOS SANTOS

DEPARTMENTS

From the Editor
Forum
Geographica
Behind the Scenes
nationalgeographic.com
National Geographic TV
New Find

Final Edit
On Assignment
Flashback

THE COVER

The earliest undisputed hominid found outside Africa had a thin brow, a small nose, and serious canines.

ART BY MAURICIO ANTÓN

♻️ Cover printed on recycled-content paper

ON THE NGM WEBSITE

nationalgeographic.com/ngm/0208
GEORGIA SKULL FIND Examine a 3-D skull image.
MOUNT FUJI Get travel tips.
SMOKEJUMPERS Video interviews reveal battles with fire.
MONKEYS Watch them go wild.
TELL US Uncover last month's mystery photo.

For membership information call
1-800-NGS-LINE (647-5463)

From the Editor

WILLIAM L. ALLEN
Editor in Chief

BERNARD OHANIAN, *Associate Editor*
ROBERT L. BOOTH, *Managing Editor*

SENIOR EDITORS

DON BELT, *Geography and World Affairs*
WILLIAM T. DOUTHITT, *Story Development*
JOHN A. ECHAVE, *Research Grant Projects*
CHRIS JOHNS, *Illustrations*
KENT J. KOBERSTEEN, *Photography*
LISA MOORE LAROE, *Staff Writers*
VALERIE A. MAY, *New Media*
PETER MILLER, *Expeditions*
JOHN G. MITCHELL, *Environment*
OLIVER PAYNE, *Manuscripts*
CONSTANCE H. PHELPS, *Design*
LESLEY B. ROGERS, *Research*
CHRISTOPHER P. SLOAN, *Art*

EDITORIAL

Assistant Editors: Joel K. Bourne, Jr., Mike Edwards, Hillel J. Hoffmann, Peter L. Porteous, Jane Vessels.
Articles Editors: Lynn Addison, Carol B. Lutyk, Glenn Oeland, Jennifer Reek. **Senior Writers:** John L. Elliot, Alan Mairson, Cathy Newman, Tom O'Neill, Cliff Tarp, Boris Weintraub, A. R. Williams, Margaret G. Zackowitz. **Writers:** Glenn Hodges, Michael Klesius, Karen E. Lange, Jennifer Steinberg, Lynne Warren. **Research:** *Senior Researchers:* Elizabeth Connell, Victoria C. Ducheneaux, Alice J. Dunn, Patricia B. Kellogg, Kathy B. Maher, Barbara W. McConnell, Mary McPeak, Jeanne E. Peters, Abigail A. Tipton, David W. Wooddell. *Researchers:* Jennifer L. Fox, Nora Gallagher, Mary Jennings, P. David Kales, Marisa J. Larson, Cathleen S. Lineberry, Robin A. Palmer, Heidi Schultz, Christy Ullrich. **New Media:** Cassandra Franklin-Barbajosa, Amanda MacEvitt. **TV Liaison:** Carol Kaufmann

ILLUSTRATIONS

Photography: Susan A. Smith, *Asst. Director*; *Photographers:* William Albert Allard, Jodi Cobb, Michael Nichols, Mark Thiessen. *Photo Engineering:* Lawrence B. Maurer. **Editors:** Dennis R. Dimick, *Asst. Director*; Bert L. Fox, T. James, Elizabeth Krist, Kathy Moran, Kurt F. Mutchler, Christopher Saptura, Susan Welchman. **Design:** Robert Gray, David C. Whitmore, *Asst. Directors*; Elaine H. Bradley. **Typography:** Jennifer C. Christiansen, Betty Clayman-DeAtley, Beth Laundon, Lisa C. Gibson. **Art:** John R. Anderson, Jr., Jeffrey L. Osborn, *Asst. Directors*; Kris Hannah, Christopher A. Klein, *Artist*; Darcy J. Bellido de Luna, Ellie Boettinger, Ann R. Perry. **Research:** **Engraving and Printing:** Janet C. Evans, *Director*; George Bounellis, Judy L. Garvey, William D. Relcherts

EDITORIAL SERVICES

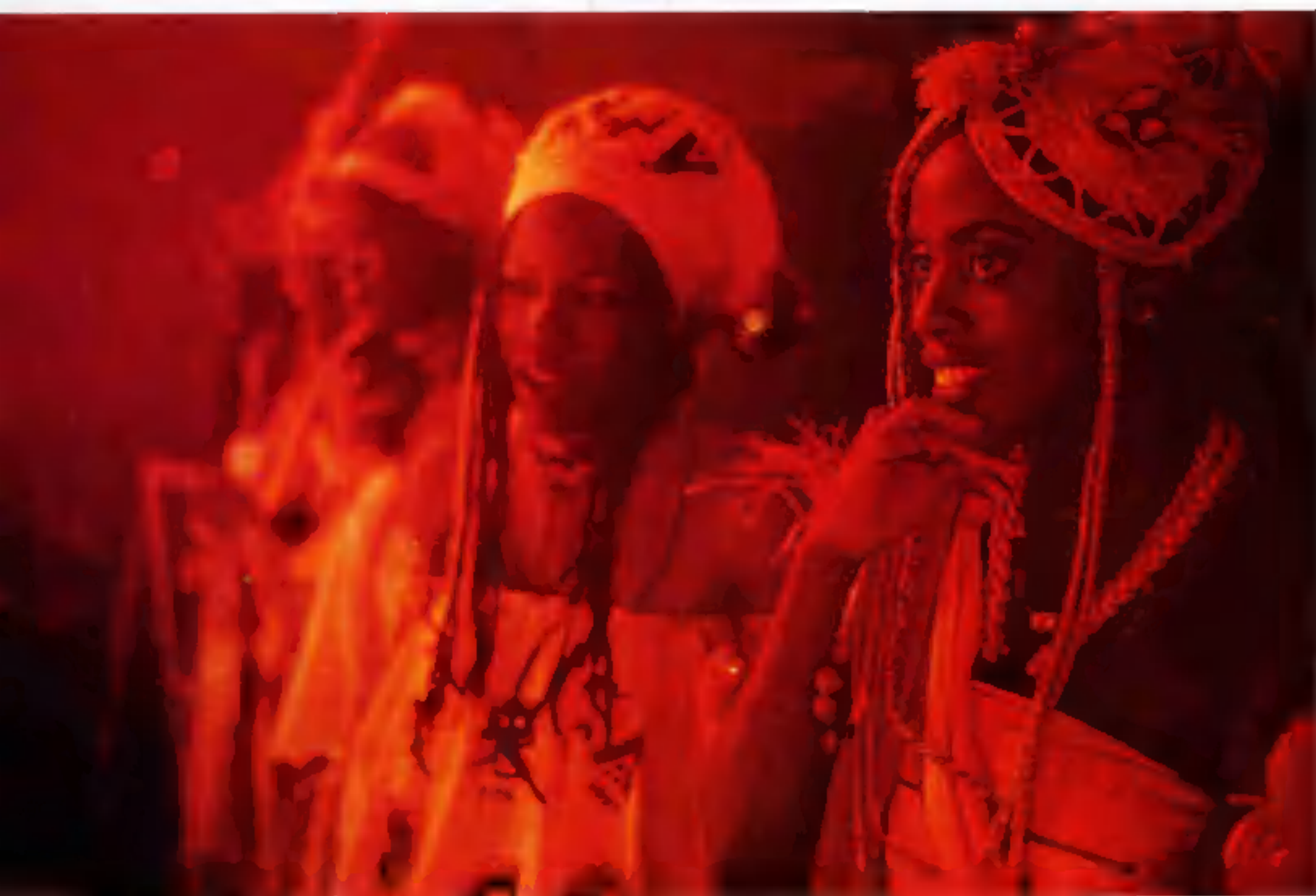
Administration: Marisa Domeyko, *Staff*; Maria-Teresa Lawrence, *Business Manager*; Brian E. Strauss, *Electronic Publishing*; Sandra M. Dane, Luz Garcia, Artemis S. Lampathakis, *Control Center*; Carol L. Dumont, *Director*. **Communications:** Mary Jeanne Jacobsen, *Vice President*; Barbara H. Fallon, Barbara S. Moffet. **Image Collection:** Maura K. Mulvihill, *Vice President*; William D. Perry, *Sales*; Carolyn J. Harrison, John A. Rutter. **Information Services:** *Correspondence:* Joseph M. Blanton, Jr., *Director*; Carol Stroud, Lisa Walker. *Libraries and Indexing:* Susan Fifer Canby, *Director*; Renee Braden, Ellen D. Briscoe, Janet Dombrowski, Barbara P. Ferry, Anne Marie Houppert, Ann E. Hubbs. *Translations:* Kathryn A. Bazo, *Director*; Sigrid Block. **Travel:** Cristine E. Ghillani

PRODUCTION SERVICES

Hans H. Wegner, *Director*. **Pre-Press:** Martin G. Anderson, Clayton R. Burneston, Phillip E. Plude, Bernard G. Quarrick. **Printing:** Joseph M. Anderson, Edward J. Holland, Ronald E. Williamson. **Quality:** Peg M. Crawford

MAGAZINE PUBLISHING

Advertising: Stephen P. Giannetti, *Vice President and Publisher*. *Associate Publishers:* Sean Flanagan, John G. Huber. *International:* Michel Siegfried. *Regional Managers:* Phillip G. Reynolds, *Midwest:* John Iavarone, *Detroit*; Ron Bottorff, *West*; John Patten, *Eastern*; Bob Amberg, *Southeast*. *Washington:* *Directors:* Pandora B. Todd, *Marketing:* Margaret Robertson, *Operations:* Gail M. Jackson, *Production*. **Integrated Marketing:** Andrea Vaughan, *Director*. **Circulation:** *Vice President:* Kitty Carroll Colbert. *Directors:* Elizabeth M. Safford, *North America*; John A. Seeley, *International*. **Member Services:** *Directors:* Christina C. Alberghini, *North America*; Myra A. McLellan, *International*



DAVID ALAN HARVEY

One African was sold into slavery by another. Packed into the holds of slave ships in unimaginably horrific conditions, the survivors arrived on a new continent doomed to a future without freedom or hope.

Two articles in this issue examine aspects of this tragic legacy. Archaeologists are excavating the remains of the *Henrietta Marie*, sunk in 1700 after delivering some 250 Africans to Jamaica. The sight of tiny shackles meant for children made my blood run cold—as did the sad fact that those children grew up to see their own children live in slavery as well.

We also explore Brazil's state of Bahia, where 80 percent of the population is of African descent. Brazil received 3.5 million slaves, more than any other country. The wealth they created for plantation owners enriched Salvador, Brazil's first capital and the first slave market in the Western Hemisphere. The cultural traditions the slaves brought with them are still alive here. Many Bahians practice Candomblé, a blend of African traditions, Catholicism, and indigenous Indian beliefs. Salvador's Festival of Black Beauty (above) celebrates Afro-Brazilian music and dance.

The shackles found on the *Henrietta Marie* will eventually rust away, but the spirit of the Africans who wore them is made of more durable stuff. I'm confident the Bahians will never forget the ways of their ancestors.

Bill Allen

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> When you wake up | <input checked="" type="checkbox"/> When the phone doesn't ring | <input checked="" type="checkbox"/> When you check your |
| <input checked="" type="checkbox"/> When you're taking a shower | <input checked="" type="checkbox"/> When you meet with your boss | <input checked="" type="checkbox"/> When you turn on the |
| <input checked="" type="checkbox"/> When you're making your bed | <input checked="" type="checkbox"/> When you meet with your clients | <input checked="" type="checkbox"/> When you're watching |
| <input checked="" type="checkbox"/> When you have your coffee | <input checked="" type="checkbox"/> When you meet anyone at all | <input checked="" type="checkbox"/> When you're peeling |
| <input checked="" type="checkbox"/> When you're putting on your socks | <input checked="" type="checkbox"/> When you walk to the deli | <input checked="" type="checkbox"/> When you're mashing |
| <input checked="" type="checkbox"/> When you're pouring your cereal | <input checked="" type="checkbox"/> When you order your sandwich | <input checked="" type="checkbox"/> When you're opening |
| <input checked="" type="checkbox"/> When you're reading the paper | <input checked="" type="checkbox"/> When you finish your pickle | <input checked="" type="checkbox"/> When you finish eati |
| <input checked="" type="checkbox"/> When you're walking the dog | <input checked="" type="checkbox"/> When you leave the office | <input checked="" type="checkbox"/> When you're having |
| <input checked="" type="checkbox"/> When you get in your car | <input checked="" type="checkbox"/> When you pick up your cleaning | <input checked="" type="checkbox"/> When you're walking |
| <input checked="" type="checkbox"/> When you're driving | <input checked="" type="checkbox"/> When you stop to get gas | <input checked="" type="checkbox"/> When you put on yo |
| <input checked="" type="checkbox"/> When you get out of your car | <input checked="" type="checkbox"/> When you walk into the store | <input checked="" type="checkbox"/> When you're washing |
| <input checked="" type="checkbox"/> When you're in the elevator | <input checked="" type="checkbox"/> When you're squeezing the melons | <input checked="" type="checkbox"/> When you're brushin |
| <input checked="" type="checkbox"/> When you walk in your office | <input checked="" type="checkbox"/> When you're checking out | <input checked="" type="checkbox"/> When you're getting |
| <input checked="" type="checkbox"/> When you're checking your email | <input checked="" type="checkbox"/> When you pull into your driveway | <input checked="" type="checkbox"/> When you're going |
| <input checked="" type="checkbox"/> When the phone rings | <input checked="" type="checkbox"/> When you unload the car | <input checked="" type="checkbox"/> When you're counti |

Because your cravings are with you 24 hours a day, so are we.

Quitting smoking is one of the hardest things you'll ever do. To succeed, you need support that's not only strong, but constant.* NicoDerm®CQ® never leaves you alone with your cravings. And our 3-step process lets you step down gradually, at your own pace. **You're not a superhero. You don't have to be.**



*If worn for 24 hours. Use as directed. Individual results may vary. Support program can improve success. GSK makes an annual grant to the ACS for cancer research and education in return for the use of their seal. © 2002 GlaxoSmithKline Consumer Healthcare

Forum

April 2002

Something about Sharbat Gula, the Afghan refugee on our June 1985 cover, touched a nerve. Just a week after the story broke, 315 letters had arrived. After a month the number of letters and phone calls had reached 1,500, one of the largest and most rapid reactions we've ever experienced. Many of you wondered how we were meeting the needs of Sharbat and her family. Read on to learn more.



Tibet

The Chinese have built schools and hospitals, but if one million Tibetans hadn't been executed at the hands of the Chinese, perhaps those victims would have made the same contribution.

RICHARD MARTINI
Santa Monica, California

I found the article on change in Tibet to be the most accurate article I have ever read in the Western world. I understand that the author had to use carefully chosen words to avoid upsetting Western readers, who are heavily conditioned by distorted reports, Hollywood movies, and propaganda from the Dalai Lama's government. Both my parents are surgeons and went to Tibet in 1958. I still remember their spending eight or nine hours in the operating room almost every working day performing surgery on patients, mostly Tibetans. I am proud of my parents' contribution in establishing a health care system in Tibet. I believe the

future status of Tibet in China will be like that of Hawaii in the United States. People's lives will become better, and a good part of their culture will be preserved. People in Tibet will still blame Han Chinese for anything they are not happy about, and they have the right to do so.

LI HUO
Cambridge, Massachusetts

The article conveyed a sense that we should abandon all hope because Tibet has been occupied for 50 years. Never is it said that peace is impossible for the Middle East or that Afghanistan can never heal. Why is Tibet left out of this optimistic promise of peace?

MICHELLE RYDER
Sumner, Washington

Once again I see more Western media denouncing the actions of China in Tibet. Certainly there was abuse and brutality during the integration of Tibet into China, but it pales in comparison to what English-speaking European immigrants have done around the world in the past 500 years. Why do I never see the list of civilizations that have been erased in order to enlarge Western societies? "Free Tibet" is a euphemism for "stop the

FOR MORE INFORMATION

MEMBERSHIP Please call
1-800-NGS-LINE (1-800-647-5463).
Special device for the hearing-impaired
(TDD) 1-800-548-9797.
Online: nationalgeographic.com/ngm
AOL Keyword: NatGeoMag



NATIONAL GEOGRAPHIC SOCIETY

"For the increase and diffusion of geographic knowledge."

The National Geographic Society is chartered in Washington, D.C., as a nonprofit scientific and educational organization. Since 1888 the Society has supported more than 7,000 explorations and research projects, adding to knowledge of earth, sea, and sky.

JOHN M. FAHEY, JR., *President and CEO*

Executive Vice Presidents

TERRENCE B. ADAMSON
TERRY D. GARCIA, *Mission Programs*
JOHN Q. GRIFFIN, *President, Magazine Group*
NINA D. HOFFMAN, *President, Books and School Publishing Group*
CHRISTOPHER A. LIEDEL, *CFO*

BOARD OF TRUSTEES

GILBERT M. GROSVENOR, *Chairman*
REG MURPHY, *Vice Chairman*
JOAN ABRAHAMSON, WILLIAM L. ALLEN,
THOMAS E. BOLGER, J. CARTER BROWN,
MARTHA E. CHURCH, MICHAEL COLLINS,
ROGER A. ENRICO, JOHN M. FAHEY, JR., JAMES H. GILLIAM, JR., JOHN JAY ISELIN, JAMES C. KAUTZ, J. WILLARD MARRIOTT, JR., FLORETTA DUKES MCKENZIE, PATRICK E. NOONAN, DENNIS R. PATRICK, NATHANIEL P. REED, WILLIAM K. REILLY, ROZANNE L. RIDGWAY, JAMES R. SASSER, B. FRANCIS SAUL II, GERD SCHULTE-HILLEN

TRUSTEES EMERITUS

Joe L. Allbritton, Owen R. Anderson, Frank Borman, Lewis M. Branscomb, Robert L. Breeden, Lloyd H. Elliott, George M. Eisey, William Graves, Mrs. Lyndon B. Johnson, Laurance S. Rockefeller, Robert C. Seamans, Jr., Frederick G. Vosburg

RESEARCH AND EXPLORATION COMMITTEE

Peter H. Raven, *Chairman*; John M. Francis, *Vice Chairman and Executive Director*; Richard S. Williams, Jr., *Vice Chairman*; Martha E. Church, Scott V. Edwards, William L. Graf, Nancy Knowlton, Dan M. Martin, Jan Nijman, Stuart L. Pimm, Elsa M. Redmond, William H. Schlesinger, Bruce D. Smith, Hans-Dieter Sues, Henry T. Wright, Patricia C. Wright

EXPLORERS-IN-RESIDENCE

Stephen Ambrose, Robert Ballard, Wade Davis, Sylvia Earle, Jane Goodall, Zahi Hawass, Johan Reinhard, Paul Sereno

CONTRIBUTING PHOTOGRAPHERS-IN-RESIDENCE

Sam Abell, David Doubilet, Karen Kasmauski, Emory Kristof, Frans Lanting

MISSION PROGRAMS

Development: Anne D. Cowie. **Education Foundation:** Barbara A. Chow. **Exhibits:** Susan S. Norton. **Expeditions Council:** Rebecca Martin. **Geography Bee:** Mary Lee Elden. **Lectures:** P. Andrew van Duyn, Gregory A. McGruder. **School Publishing:** Ericka Markman, *Sr. Vice President*. **International:** Robert W. Hernández, *Sr. Vice President*. **Human Resources:** Thomas A. Sablò, *Sr. Vice President*. **Communications:** Betty Hudson, *Sr. Vice President*

ADMINISTRATION

Finance: Michael J. Cole, *Controller*; H. Gregory Platts, *Treasurer*. **Information Technology:** Bernard J. Callahan, John D. Nguyen. **Law:** Susan Borke, Angelo M. Grima, Suzanne R. McDowell. **Membership and Marketing Services:** Mary P. Donohoe

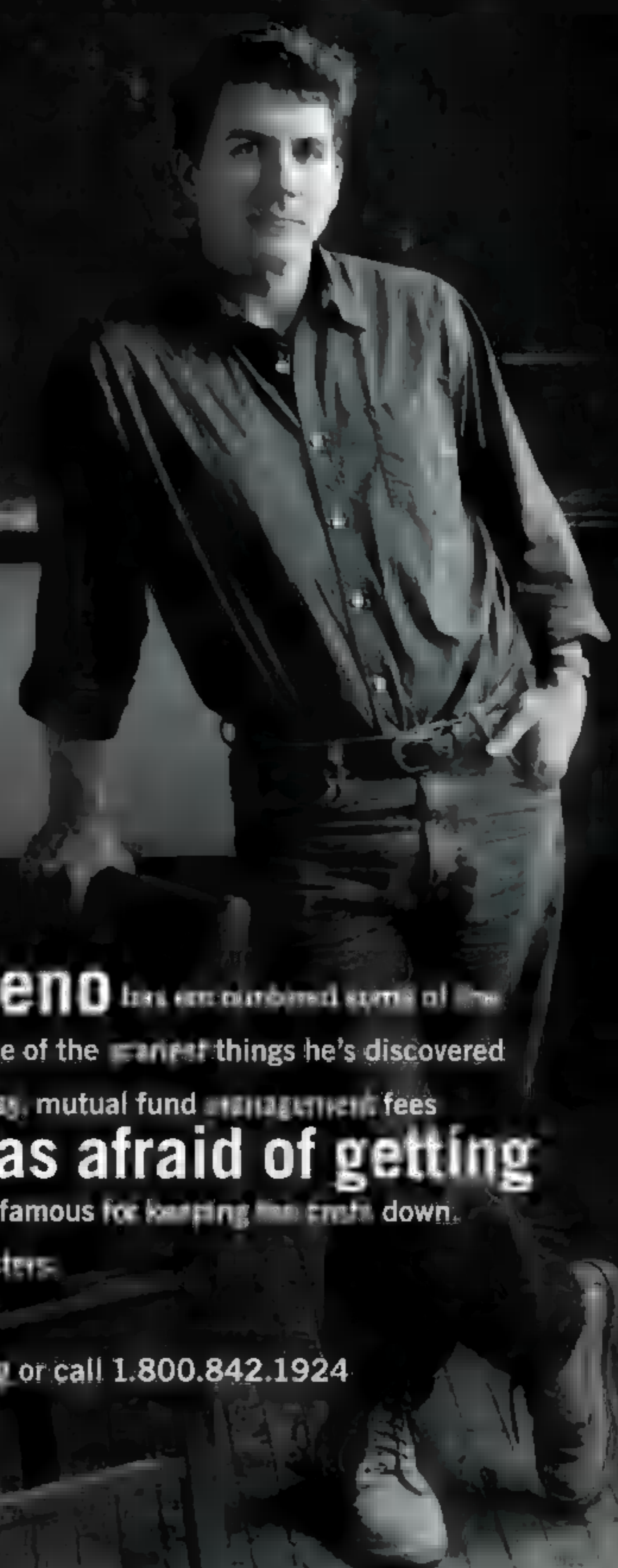
NATIONAL GEOGRAPHIC VENTURES

C. RICHARD ALLEN, *President and CEO*

Television: Timothy T. Kelly, *President*. **National Geographic Channel:** David Haslingden, *President*, *International*; Laureen Ong, *President, U.S.*; Andrew C. Wilk, *Exec. Vice President, Programming*. **nationalgeographic.com:** Mitchell Praver, *President*. **Maps:** William L. Stoehr, *President*; Allen Carroll, *Chief Cartographer*. **Enterprises:** Linda Berkeley, *President*; Lynn Cutter, *Travel*; John Dumbacher, *Licensing*. **Finance:** Frances A. Marshall

Contributions to the National Geographic Society are tax deductible under Section 501(c)(3) of the U.S. tax code.

Copyright © 2002 National Geographic Society. All rights reserved. NATIONAL GEOGRAPHIC and Yellow Border: Registered Trademarks © Marcas Registradas. NATIONAL GEOGRAPHIC assumes no responsibility for unsolicited materials. Printed in U.S.A.



Paleontologist Paul Sereno has discovered some of the weirdest creatures that ever walked the earth. Yet some of the scariest things he's discovered aren't likely to become extinct anytime soon. Sad to say, mutual fund management fees will probably cost us all. That's why Dr. Sereno **was afraid of getting eaten alive.** So he turned to a company famous for keeping the costs down. That meant more money for him and less for the monsters.

Log on for ideas, advice, and results, TIAA-CREF.org or call 1.800.842.1924



Managing money for people with other things to think about.

RETIREMENT | INSURANCE | MUTUAL FUNDS | EQUITY INVESTMENTS | TRUSTS | INVESTMENT MANAGEMENT

TIAA-CREF Group, Inc. is a member of TIAA, a registered broker-dealer in securities, and CREF, a registered investment advisor. TIAA-CREF Group, Inc. is a member of the TIAA-CREF Group, Inc. For more information, visit www.tiaa-cref.org or call 1.800.842.1924. Read it carefully before you make a decision to invest. Investment objectives, risks, charges, expenses, and other important information are contained in the prospectus for each investment. Please read the prospectus carefully before you invest.

A Life Revealed

I just need to express how glad I am that you located Sharbat Gula. I was only 15 years old when she first appeared on your cover. I had just experienced the death of my mother and had been in several foster homes and felt so alone and scared. I think that Sharbat probably felt the same. Thank you for letting us know that she has endured and survived this sometimes lonely and scary life.

GRISELDA PADILLA
Washington, Illinois

"Found" is profound. I was a Peace Corps volunteer in Afghanistan from 1973 to '76. I'd give anything to know that my students at Kabul University during that time are OK.



Sharbat has survived such strife. It gives me hope that my former students are OK too.

BRIDGET N. O'CONNOR
New York, New York

Are you going to compensate

Sharbat Gula in some way, seeing her image brought the magazine so much fame?

NARASU REBBAPRAGADA
Oakland, California

We've provided Sharbat and her family with medical care and other forms of assistance. But they've asked us to respect their privacy by minimizing the specifics we share about that help. Her family has lived a quiet, simple life—they want it to stay that way. Sharbat's children aren't the only ones who need help. We've created the Afghan Girls Fund to provide educational opportunities for the young women of Afghanistan. Sharbat knows this, and she's delighted. Contributions can be made online at nationalgeographic.com.

Chinese before they get too powerful." It is a movement based on fear and contempt for the Chinese people.

K. PING CHANG LEE
Olympia, Washington

The suggestion that China may have a "legitimate claim" on Tibet, along with the comparison of the U.S. acquiring land from Native Americans with China invading Tibet, is simplistic and insulting. It whitewashes the historic fact that a country was brutally invaded, a million people were murdered or sent into exile, and attempts were made to destroy their culture.

WRITE TO FORUM

National Geographic Magazine, PO Box 98199, Washington, DC 20090-8199, or by fax to 202-828-5460, or via the internet to ngsforum@nationalgeographic.com. Include name, address, and daytime telephone. Letters may be edited for clarity and space.

Let's call what happened in Tibet what it really was—a travesty to the human condition.

MICHAEL J. DADTKA
Wauwatosa, Wisconsin

The last sentence summed it up perfectly: "They simply want their country back." Instead of writing on the stereotypical image of Tibet as a mythical Shangri-la, the magazine investigated the foreign occupation that Tibet has had to endure during the last 50 years. Thank you.

TENZIN SELDON DEKHANG
McLean, Virginia

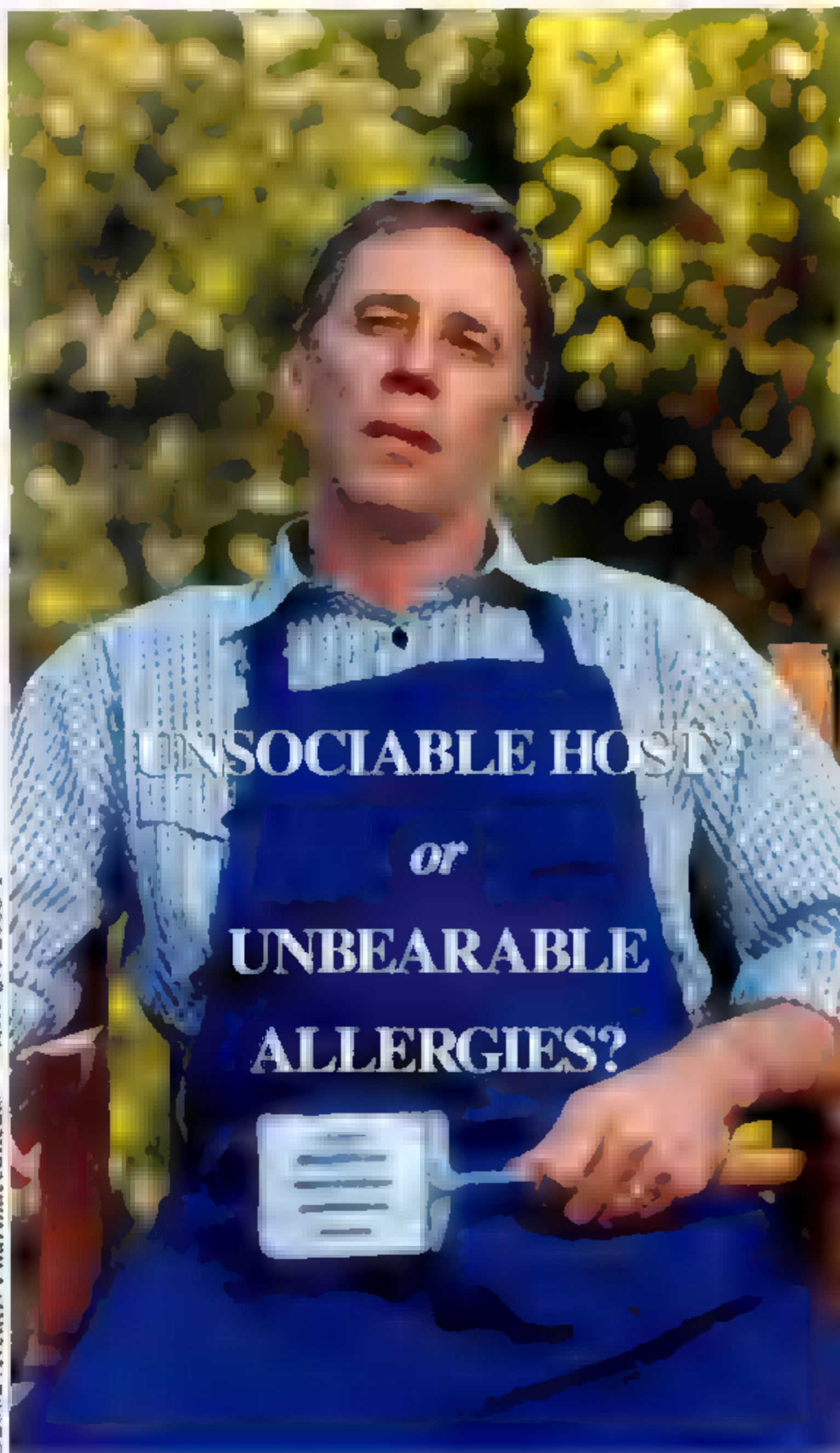
As an employee of a Tibetan aid foundation, I spent two summers working in the Surmang region south of Gyegu. Along the roads Tibetans wore a mix of Chinese and Tibetan dress, lived in squalid Chinese brick compounds, and ran various enterprises like restaurants and truck stops. Those

Tibetans, whom the author sees as "moving forward," are not hanging on to their culture but rather have lost a great deal of their identity in order to survive on China's terms.

PHILIPP MOLZER
West Orange, New Jersey

The quote "Buddhism is a constant, overriding presence, involving never ending rituals to assure good fortune and, ultimately, rebirth" couldn't be further from the truth of Buddhism. The path to Nirvana is to stop by your own volition the cycle of birth and death (with all its attendant suffering). Our so-called rituals are not performed to get some benefit back in this life. We build stupas and pagodas and enshrine relics and prostrate before the Great Teacher in homage—not in search of "good fortune."

SUMANE IYER
Berwowra, Australia



If your allergies make you feel too “burnt out” to enjoy even a leisurely barbecue, once-daily Allegra can help.

Long-Lasting Relief

Only Allegra contains the exclusive ingredient fexofenadine. So it provides powerful seasonal allergy relief that lasts a full 24 hours.

Non-Drowsy

Unlike many other antihistamines, Allegra won't make you drowsy. For people twelve and older. Side effects are low and may include headache, cold or back pain.

Talk to your doctor today about allergies and free Allegra samples, and get back to your party.

For more information, visit allegra.com or call 1-800-allegra.

Real relief. For real living.



ALLEGRA[®]

(fexofenadine hydrochloride)
Capsules and Tablets

INDICATIONS AND USAGE

Seasonal Allergic Rhinitis

ALLEGRA is indicated for the relief of symptoms associated with seasonal allergic rhinitis in adults and children 6 years of age and older. Symptoms treated effectively were sneezing, rhinorrhea, itchy nose/palate/throat, itchy/watery/red eyes.

Chronic Idiopathic Urticaria

ALLEGRA is indicated for treatment of uncomplicated skin manifestations of chronic idiopathic urticaria in adults and children 6 years of age and older. It significantly reduces pruritus and the number of wheals.

CONTRAINDICATIONS

ALLEGRA is contraindicated in patients with known hypersensitivity to any of its ingredients.

PRECAUTIONS

Drug Interaction with Erythromycin and Ketoconazole

Fexofenadine hydrochloride has been shown to exhibit minimal (ca. 5%) metabolism. However, co-administration of fexofenadine hydrochloride with ketoconazole and erythromycin led to increased plasma levels of fexofenadine hydrochloride. Fexofenadine hydrochloride had no effect on the pharmacokinetics of erythromycin and ketoconazole. In two separate studies, fexofenadine hydrochloride 120 mg twice daily (two times the recommended twice daily dose) was co-administered with erythromycin 500 mg every 8 hours or ketoconazole 400 mg once daily under steady-state conditions to normal, healthy volunteers (n=24, each study). No differences in adverse events or QT_c interval were observed when patients were administered fexofenadine hydrochloride alone or in combination with erythromycin or ketoconazole. The findings of these studies are summarized in the following table:

Effects on steady-state fexofenadine hydrochloride pharmacokinetics after 7 days of co-administration with fexofenadine hydrochloride 120 mg every 12 hours (two times the recommended twice daily dose) in normal volunteers (n=24)

Concomitant Drug	C _{max,SS} (Peak plasma concentration)	AUC _{0-12h} (Extent of systemic exposure)
Erythromycin (500 mg every 8 hrs)	+82%	+109%
Ketoconazole (400 mg once daily)	+135%	+164%

The changes in plasma levels were within the range of plasma levels achieved in adequate and well-controlled clinical trials.

The mechanism of these interactions has been evaluated in *in vitro*, *in situ*, and *in vivo* animal models. These studies indicate that ketoconazole or erythromycin co-administration enhances fexofenadine gastrointestinal absorption. *In vivo* animal studies also suggest that in addition to increasing absorption, ketoconazole decreases fexofenadine hydrochloride gastrointestinal secretion, while erythromycin may also decrease biliary excretion.

Drug Interactions with Antacids

Administration of 120 mg of fexofenadine hydrochloride (2 x 60 mg capsule) within 15 minutes of an aluminum and magnesium containing antacid (Maalox[®]) decreased fexofenadine AUC by 41% and C_{max} by 43%. ALLEGRA should not be taken closely in time with aluminum and magnesium containing antacids.

Carcinogenesis, Mutagenesis, Impairment of Fertility

The carcinogenic potential and reproductive toxicity of fexofenadine hydrochloride were assessed using terfenadine studies with adequate fexofenadine hydrochloride exposure (based on plasma area-under-the-concentration vs. time [AUC] values). No evidence of carcinogenicity was observed in an 18-month study in mice and in a 24-month study in rats at oral doses up to 150 mg/kg of terfenadine (which led to fexofenadine exposures that were respectively approximately 3 and 5 times the exposure from the maximum recommended daily oral dose of fexofenadine hydrochloride in adults and children).

In vitro (Bacterial Reverse Mutation, CHO:HPRT Forward Mutation, and Rat Lymphocyte Chromosomal Aberration assays) and *in vivo* (Mouse Bone Marrow Micronucleus assay) tests, fexofenadine hydrochloride revealed no evidence of mutagenicity.

In rat fertility studies, dose-related reductions in implants and increases in postimplantation losses were observed at an oral dose of 150 mg/kg of terfenadine (which led to fexofenadine hydrochloride exposures that were approximately 3 times the exposure of the maximum recommended daily oral dose of fexofenadine hydrochloride in adults).

Pregnancy

Teratogenic Effects: Category C. There was no evidence of teratogenicity in rats or rabbits at oral doses of terfenadine up to 300 mg/kg (which led to fexofenadine exposures that were approximately 4 and 31 times, respectively, the exposure from the maximum recommended daily oral dose of fexofenadine in adults).

There are no adequate and well controlled studies in pregnant women. Fexofenadine should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Nonteratogenic Effects. Dose-related decreases in pup weight gain and survival were observed in rats exposed to an oral dose of 150 mg/kg of terfenadine (approximately 3 times the maximum recommended daily oral dose of fexofenadine hydrochloride in adults based on comparison of fexofenadine hydrochloride AUCs).

Nursing Mothers

There are no adequate and well-controlled studies in women during lactation. Because many drugs are excreted in human milk, caution should be exercised when fexofenadine hydrochloride is administered to a nursing woman.

Pediatric Use

The recommended dose in patients 6 to 11 years of age is based on cross-study comparison of the pharmacokinetics of ALLEGRA in adults and pediatric patients and on the safety profile of fexofenadine hydrochloride in both adult and pediatric patients at doses equal to or higher than the recommended doses.

The safety of ALLEGRA tablets at a dose of 30 mg twice daily has been demonstrated in 438 pediatric patients 6 to 11 years of age in two placebo-controlled 2-week seasonal allergic rhinitis trials. The safety of ALLEGRA for the treatment of chronic idiopathic urticaria in patients 6 to 11 years of age is based on cross-study comparison of the pharmacokinetics of ALLEGRA in adult and pediatric patients and on the safety profile of fexofenadine in both adult and pediatric patients at doses equal to or higher than the recommended dose.

The effectiveness of ALLEGRA for the treatment of seasonal allergic rhinitis in patients 6 to 11 years of age was demonstrated in one trial (n=411) in which ALLEGRA tablets 30 mg twice daily significantly reduced total symptom scores compared to placebo, along with extrapolation of demonstrated efficacy in patients ages 12 years and above, and the pharmacokinetic comparisons in adults and children. The effectiveness of ALLEGRA for the treatment of chronic idiopathic urticaria in patients 6 to 11 years of age is based on an extrapolation of the demonstrated efficacy of ALLEGRA in adults with this condition and the likelihood that the disease course, pathophysiology and the drug's effect are substantially similar in children to that of adult patients. The safety and effectiveness of ALLEGRA in pediatric patients under 6 years of age have not been established.

Geriatric Use

Clinical studies of ALLEGRA tablets and capsules did not include sufficient numbers of subjects aged 65 years and over to determine whether this population responds differently from younger patients. Other reported clinical experience has not identified differences in responses between the geriatric and younger patients. This drug is known to be substantially excreted by the kidney, and the risk of toxic reactions to this drug may be greater in patients with impaired renal function. Because elderly patients are more likely to have decreased renal function, care should be taken in dose selection, and may be useful to monitor renal function. (See CLINICAL PHARMACOLOGY).

ADVERSE REACTIONS

Seasonal Allergic Rhinitis

Adults. In placebo-controlled seasonal allergic rhinitis clinical trials in patients 12 years of age and older, which included 2461 patients receiving fexofenadine hydrochloride capsules at doses of 20 mg to 240 mg twice daily, adverse events were similar in fexofenadine hydrochloride and placebo-treated patients. All

adverse events that were reported by greater than 1% of patients who received the recommended daily dose of fexofenadine hydrochloride (60 mg capsules twice daily), and that were more common with fexofenadine hydrochloride than placebo, are listed in Table 1.

In a placebo-controlled clinical study in the United States, which included 570 patients aged 12 years and older receiving fexofenadine hydrochloride tablets at doses of 120 or 180 mg once daily, adverse events were similar in fexofenadine hydrochloride and placebo-treated patients. Table 1 also lists adverse experiences that were reported by greater than 2% of patients treated with fexofenadine hydrochloride tablets at doses of 180 mg once daily and that were more common with fexofenadine hydrochloride than placebo. The incidence of adverse events, including drowsiness, was not dose-related and was similar across subgroups defined by age, gender, and race.

Table 1

Adverse experiences in patients ages 12 years and older reported in placebo-controlled seasonal allergic rhinitis clinical trials in the United States

Twice daily dosing with fexofenadine capsules at rates of greater than 1%

Adverse experience	Fexofenadine 60 mg Twice Daily (n=679)	Placebo Twice Daily (n=671)
Viral infection (cold, flu)	2.5%	1.5%
Nausea	1.8%	1.5%
Dysmenorrhea	1.5%	0.3%
Drowsiness	1.3%	0.9%
Dyspepsia	1.3%	0.6%
Fatigue	1.3%	0.9%

Once daily dosing with fexofenadine hydrochloride tablets at rates of greater than 2%

Adverse experience	Fexofenadine 180 mg once daily (n=283)	Placebo (n=293)
Headache	10.6%	7.5%
Upper Respiratory Tract Infection	3.2%	3.1%
Back Pain	2.8%	1.4%

The frequency and magnitude of laboratory abnormalities were similar in fexofenadine hydrochloride and placebo-treated patients.

Pediatric. Table 2 lists adverse experiences in patients aged 6 to 11 years of age which were reported by greater than 2% of patients treated with fexofenadine hydrochloride tablets at a dose of 30 mg twice daily in placebo-controlled seasonal allergic rhinitis studies in the United States and Canada that were more common with fexofenadine hydrochloride than placebo.

Table 2

Adverse experiences reported in placebo-controlled seasonal allergic rhinitis studies in pediatric patients ages 6 to 11 in the United States and Canada at rates of greater than 2%

Adverse experience	Fexofenadine 30 mg twice daily (n=209)	Placebo (n=229)
Headache	7.2%	6.6%
Accidental injury	2.9%	1.3%
Coughing	3.8%	1.3%
Fever	2.4%	0.9%
Pain	2.4%	0.4%
Otitis Media	2.4%	0.0%
Upper Respiratory Tract Infection	4.3%	1.7%

Chronic Idiopathic Urticaria

Adverse events reported by patients 12 years of age and older in placebo-controlled chronic idiopathic urticaria studies were similar to those reported in placebo-controlled seasonal allergic rhinitis studies. In placebo-controlled chronic idiopathic urticaria clinical trials, which included 726 patients 12 years of age and older receiving fexofenadine hydrochloride tablets at doses of 20 to 240 mg twice daily, adverse events were similar in fexofenadine hydrochloride and placebo-treated patients. Table 3 lists adverse experiences in patients aged 12 years and older which were reported by greater than 2% of patients treated with fexofenadine hydrochloride 60 mg tablets twice daily in controlled clinical studies in the United States and Canada and that were more common with fexofenadine hydrochloride than placebo. The safety of fexofenadine hydrochloride in the treatment of chronic idiopathic urticaria in pediatric patients 6 to 11 years of age is based on the safety profile of fexofenadine hydrochloride in adults and adolescent patients at doses equal to or higher than the recommended dose (see Pediatric Use).

Table 3

Adverse experiences reported in patients 12 years and older in placebo-controlled chronic idiopathic urticaria studies in the United States and Canada at rates of greater than 2%

Adverse experience	Fexofenadine 60 mg twice daily (n=186)	Placebo (n=178)
Back Pain	2.2%	1.1%
Sinusitis	2.2%	1.1%
Dizziness	2.2%	0.6%
Drowsiness	2.2%	0.0%

Events that have been reported during controlled clinical trials involving seasonal allergic rhinitis and chronic idiopathic urticaria patients with incidences less than 1% and similar to placebo and have been rarely reported during postmarketing surveillance include: insomnia, nervousness, and sleep disorders or parosmia. In rare cases, rash, urticaria, pruritus and hypersensitivity reactions with manifestations such as angioedema, chest tightness, dyspnea, flushing and systemic anaphylaxis have been reported.

OVERDOSAGE

Reports of fexofenadine hydrochloride overdose have been infrequent and contain limited information. However, dizziness, drowsiness and dry mouth have been reported. Single doses of fexofenadine hydrochloride up to 800 mg (six normal volunteers at this dose level), and doses up to 690 mg twice daily for 1 month (three normal volunteers at this dose level) or 240 mg once daily for 1 year (234 normal volunteers at this dose level) were administered without the development of clinically significant adverse events as compared to placebo.

In the event of overdose, consider standard measures to remove any unabsorbed drug. Symptomatic and supportive treatment is recommended.

Hemodialysis did not effectively remove fexofenadine hydrochloride from blood (1.7% removed) following terfenadine administration.

No deaths occurred at oral doses of fexofenadine hydrochloride up to 5000 mg/kg in mice (110 times the maximum recommended daily oral dose in adults and 200 times the maximum recommended daily oral dose in children based on mg/m²) and up to 5000 mg/kg in rats (230 times the maximum recommended daily oral dose in adults and 400 times the maximum recommended daily oral dose in children based on mg/m²). Additionally, no clinical signs of toxicity or gross pathological findings were observed. In dogs, no evidence of toxicity was observed at oral doses up to 2000 mg/kg (300 times the maximum recommended daily oral dose in adults and 530 times the maximum recommended daily oral dose in children based on mg/m²).

Prescribing Information as of November 2000

Aventis Pharmaceuticals Inc
Kansas City, MO 64137 USA
US Patents 4,254,129; 5,375,693; 5,578,610
www.allegra.com
allb1100Ad
ALG-JA-2068-1



Aventis Pharmaceuticals
Bridgewater, NJ 08807

The author replies: I was writing about Tibetan peasants who didn't receive formal religious training. Given the difficult reality of their daily lives, they're not looking for release from the wheel; just to survive another day. Nirvana is the furthest thing from their minds.

Bat Patrol

I have seen the Carlsbad Caves in New Mexico, but Bracken Cave, as described in your article, was far more impressive. I was amazed that this is on private property. It is an incredible resource that needs protection.

RONALD C. STINSON
Solana Beach, California

When I was a student at the University of Texas at Austin, nighttime football games were by far my favorite—not so much for the game, but because the Mexican free-tailed bats would come out and feed on the insects attracted by the stadium lights.

ELIZABETH HUTTON
San Antonio, Texas

Muskoxen

Last August I visited Greenland. We saw several muskoxen and always kept a distance to avoid provoking them. On one of our walks three of us observed a lone bull on a ridge 150 meters away. Suddenly it came running toward us, and as we felt threatened, we fired two shots to scare it off. The bull stopped 50 meters away, and we began backing up, hoping our retreat would calm the animal. It did not work. The bull lowered its head and attacked at full speed. Now we had to shoot to kill, and luckily 15 meters away the bull stopped, swayed, and fell. We would have liked to have left the national park without any trace. However, in a wilderness like this you are an intruder and must be

We began backing up, hoping our retreat would calm the animal. It did not work. The bull . . . attacked at full speed. Now we had to shoot to kill, and luckily 15 meters away the bull stopped, swayed, and fell.

prepared to defend yourself, and that was what we did.

OLA HEENSAEN
Lillehammer, Norway

Lewis and Clark

I feel the American public needs to know more about the Missouri River and its adjacent lands. Today the Loess Hills of western Iowa are at the center of efforts to preserve the region from development and from invasive species that are wiping out the prairie. A draft statement by the National Park Service declares that the region is significant enough to be included in the park program, but the resources are not available to buy private land to protect it. We fear the remaining prairies will be destroyed by invading trees or carted off for fill.

JIM REDMOND
Sioux City, Iowa

ZipUSA: Pickstown, SD

Tom Brokaw's article was interesting to me because I had worked on a similar Army Corps of Engineers' dam project in Montana called Fort Peck. It too had

a townsite built by the Corps to house the dam's employees. Construction on the Fort Peck project began in 1932 and was completed in 1940, making it—rather than Pickstown's—the first of the dams built across the Missouri. Construction at Pickstown didn't begin until 1946.

LOUIS R. NOFFSINGER
Arlington, Virginia

Geographica

We look on in wonder at the progress made by Canada, Germany, Spain, and Denmark toward developing wind power as an alternative energy source. Unfortunately the U.S. Senate on March 14 refused to impose standards on the energy industry that would greatly increase the production of renewable energy. The power industry will not take action in this direction unless mandated by the government. The industry must be required to reduce our dependency on foreign oil.

STEPHEN J. KIMMEL
Flagstaff, Arizona

Ask Us

I was surprised that Jerry Drago had never encountered an empty skunk. On the farm where I grew up skunks were frequent visitors. One evening as my parents and I strolled among the outbuildings, we encountered a juvenile skunk. Our dog saw it too. As the dog approached, the skunk sprayed. Being somewhat courageous, the dog shook his head, rubbed his nose in the dirt, and approached again. The skunk raised its tail and tried and tried, but nothing happened!

IRENE EGGERS
Boulder, Colorado

WE OCCASIONALLY MAKE OUR CUSTOMER LIST AVAILABLE TO CAREFULLY SCREENED COMPANIES WHOSE PRODUCTS OR SERVICES MAY BE OF INTEREST TO YOU. IF YOU PREFER NOT TO RECEIVE SUCH MAILINGS, U.S. AND CANADIAN CUSTOMERS PLEASE CALL 1-800-NGS-LINE (1-800-647-5463). INTERNATIONAL CUSTOMERS PLEASE CALL +1-813-979-6345 OR WRITE: NATIONAL GEOGRAPHIC SOCIETY, PO BOX 63005, TAMPA, FL 33663-3005. PLEASE INCLUDE THE ADDRESS AREA FROM YOUR MAGAZINE WRAPPER WHEN WRITING.

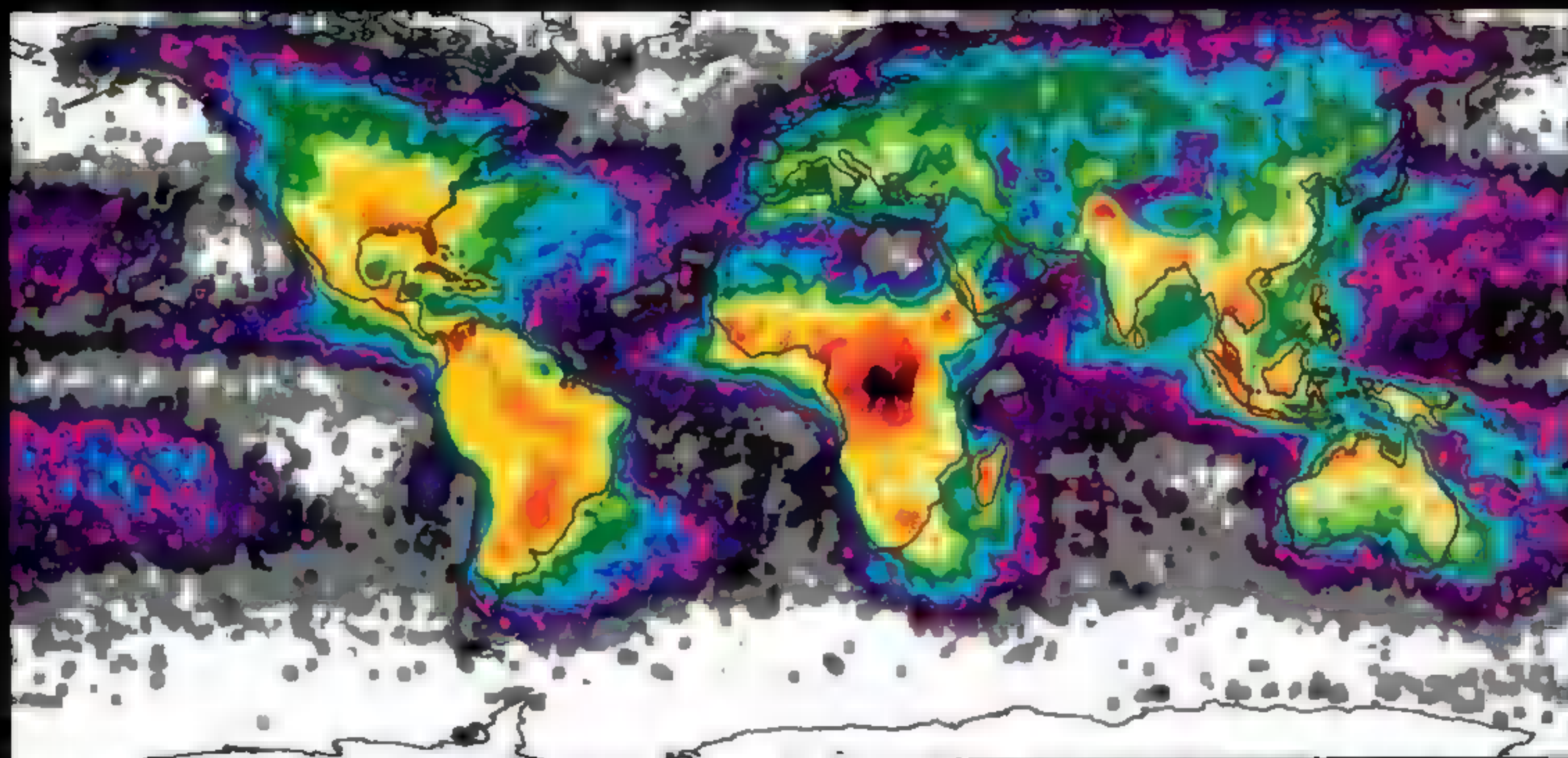
GEOGR

T H E P E O P L E , P L A C E S , A N D

METEOROLOGY

In the Line of Fire

First global lightning map reveals high-strike zones



MAP: NATIONAL SPACE ADMINISTRATION AND NASA; LIGHTNING DATA: THOMAS A. DOSWELL III

Where does lightning strike most often? A new composite map of satellite images (above) offers the first complete picture of lightning activity around the world. The images were made by two satellites equipped with near-infrared optical sensors.

"These sensors detect changes in the tops of clouds, changes your eyes can't see," says Holly Chubb of the National Space Science and Technology Center. Black, red, and orange denote the most strikes; blue, violet, gray, and white show the least. Florida, where moist air from

the Atlantic and the Gulf of Mexico collides, is a hot spot. So is central Africa, where thunderstorms occur year-round. Want to avoid getting hit? Move to North Africa, arid western China, or a small Pacific island—some island languages don't even have a word for lightning.

APHICA

CREATURES OF OUR UNIVERSE





JACK W. DYKING/A

INSECT WORLD

Monarchs: The Body Count

Massive winterkill raises estimate of living butterflies

Victims of a January storm, monarch butterflies carpet the ground west of Mexico City (above). But from death comes understanding for researcher Lincoln Brower of Sweet Briar College. For 25 years

he has trekked to the monarchs' winter homes—fir forests in central Mexico—after they migrate from points north. Winter storm mortality isn't uncommon, but this year it was catastrophic: 273 million monarchs perished in

two colonies, Brower figures. That raised a statistical problem. In 1977 Brower calculated that Mexico's overwintering monarchs totaled roughly 100 million. But after counting the dead butterflies and extrapolating to arrive at a more accurate tally of the living, he now thinks the number of migrant monarchs in Mexico each year may be closer to half a billion—a figure Brower calls staggering.



GALEN ROWELL/MOUNTAIN LIGHT PHOTOGRAPHY

CONSERVATION

Panthers: 80, Rising

New genes may offer hope for the Florida panther. A recent census tallied some 80 cats in southwestern Florida, compared with 30 to 50

a decade ago. John Kasbohm of the U.S. Fish and Wildlife Service thinks crossbreeding with a Texas subspecies in 1995 may be reducing genetic defects. Roadkill remains a problem, but underpasses built for wildlife and miles of fencing have sharply reduced the toll along some highways.

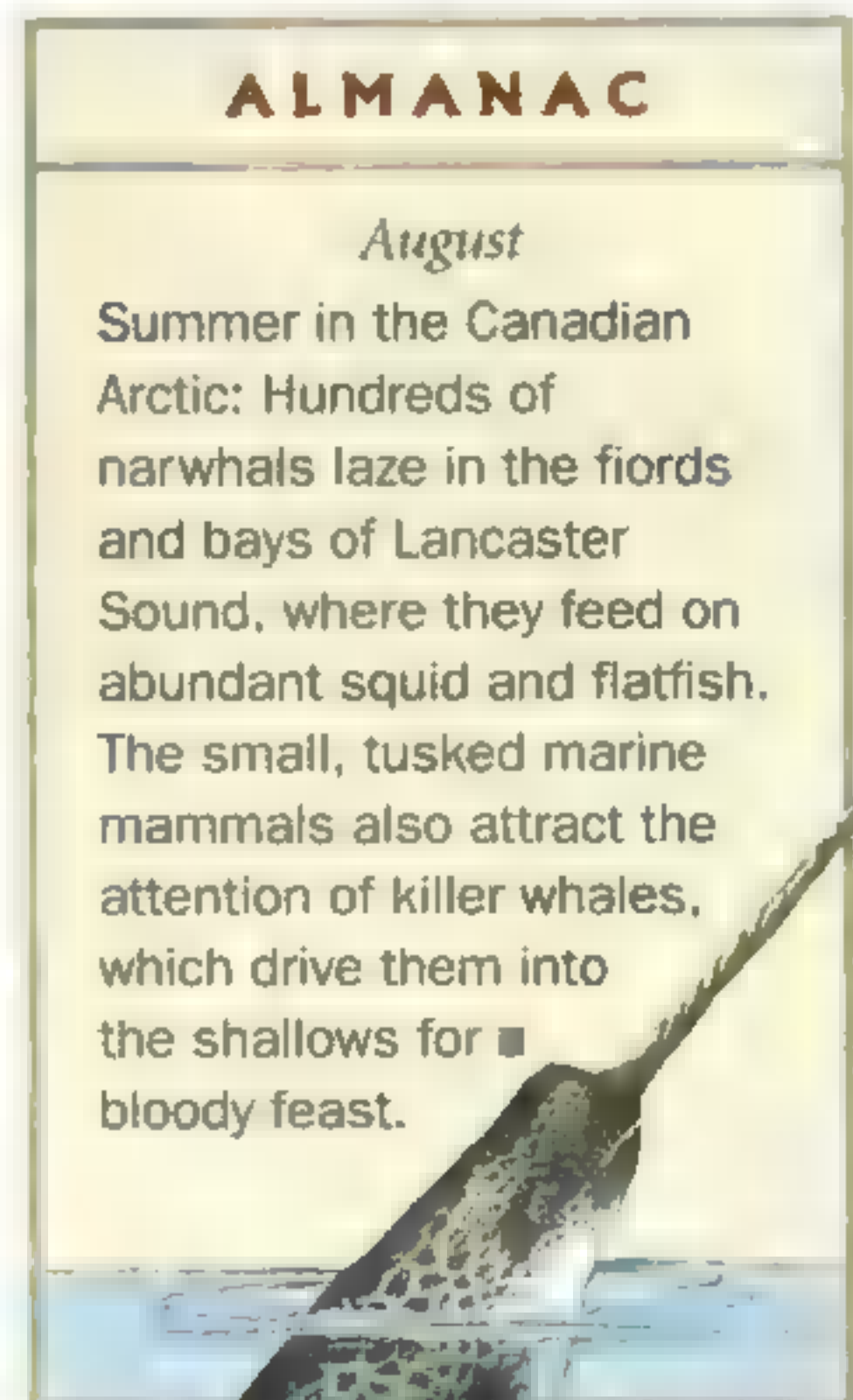
MORE ON OUR WEBSITE

Find links and resources selected by our Research Division ■ nationalgeographic.com/ngm/resources/0208.

ALMANAC

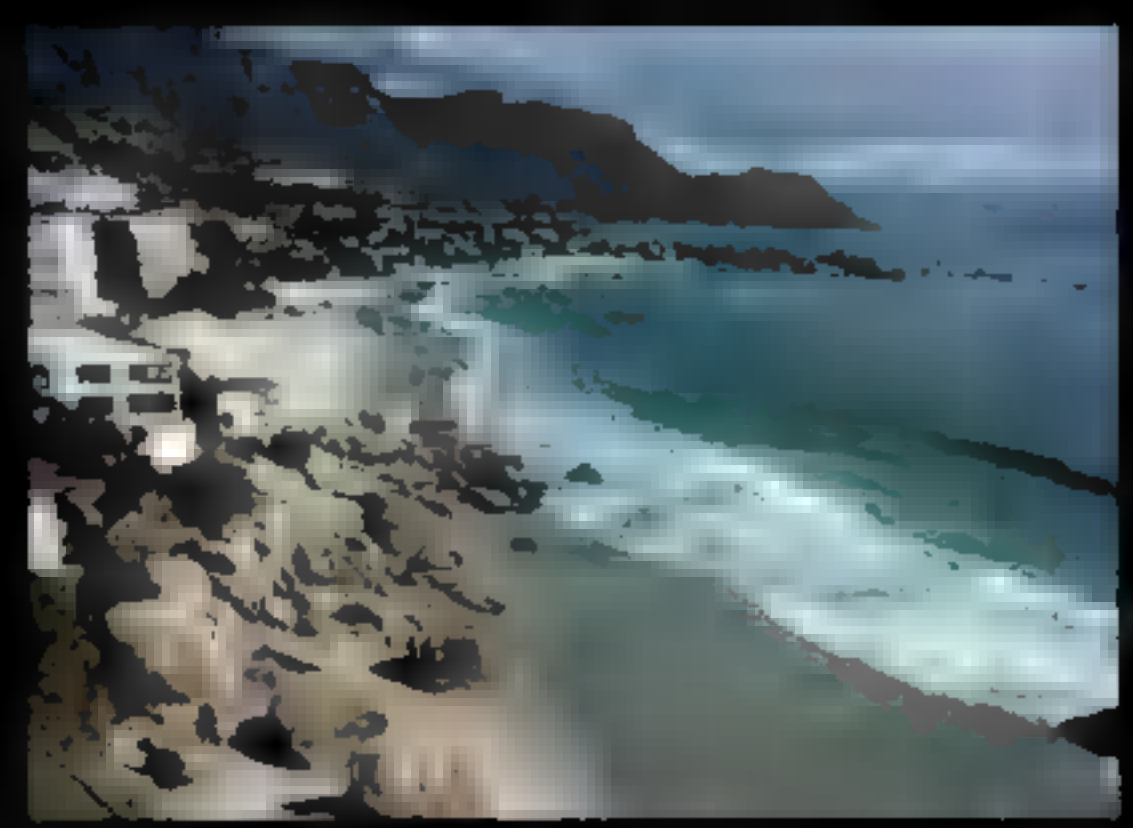
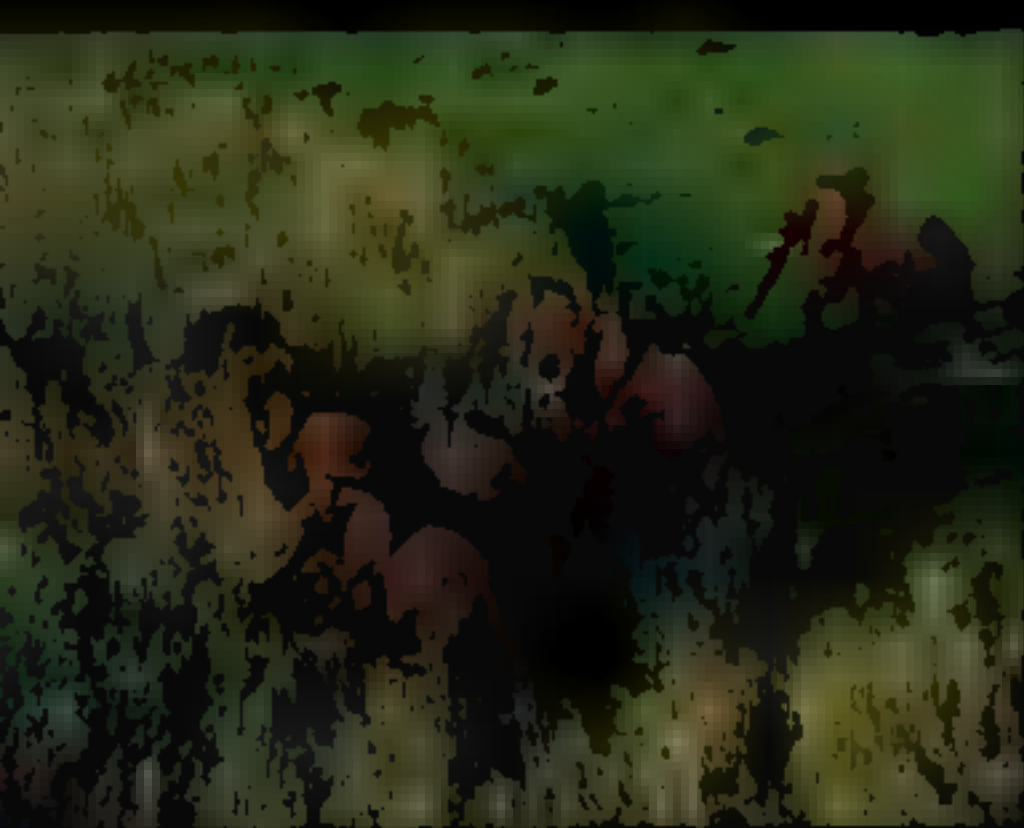
August

Summer in the Canadian Arctic: Hundreds of narwhals laze in the fiords and bays of Lancaster Sound, where they feed on abundant squid and flatfish. The small, tusked marine mammals also attract the attention of killer whales, which drive them into the shallows for ■ bloody feast.



ART BY DON BREEDEN





Enter to win the
**AFRICAN PHOTO SAFARI
 OF A LIFETIME**

at nationalgeographic.com/paththeadventure



NO PURCHASE OR INTERNET ACCESS NECESSARY. A PURCHASE WILL NOT INCREASE YOUR CHANCES OF WINNING. Good only to U.S. residents. Sweepstakes ends 12/31/07. For complete rules and regulations, visit nationalgeographic.com/paththeadventure.

The Nissan Pathfinder has crossed the wild and rugged expanses of uncharted Africa—and now it's your turn. Enter online to win a 13-day photographic African safari for two, filled with stunning landscapes, unique wildlife and unbelievable experiences. You'll join a National Geographic Expedition led by a world-renowned National Geographic photographer. From the wild savanna to private game reserves, it's a unique experience that you'll never forget. nationalgeographic.com/paththeadventure. To learn more about the Nissan Pathfinder, just go to NissanUSA.com.





THE 240-HP NISSAN PATHFINDER is tough enough to unlikely, you could just as easily drive around the planet, but it does know it wouldn't be a picnic. An all-powerful 240-horsepower V6 engine tames the most unruly terrain. A sophisticated 4WD system reduces mountain ranges to speed bumps. While the leather-appointed interior makes sure you never break a sweat. Find out more. Call 800-326-9116 or visit NissanDriven.com. And be sure to enter the "Path to Adventure" photo safari sweepstakes at nationalgeographic.com/pathtoadventure. For once, you'll have a vacation slide show worth watching.



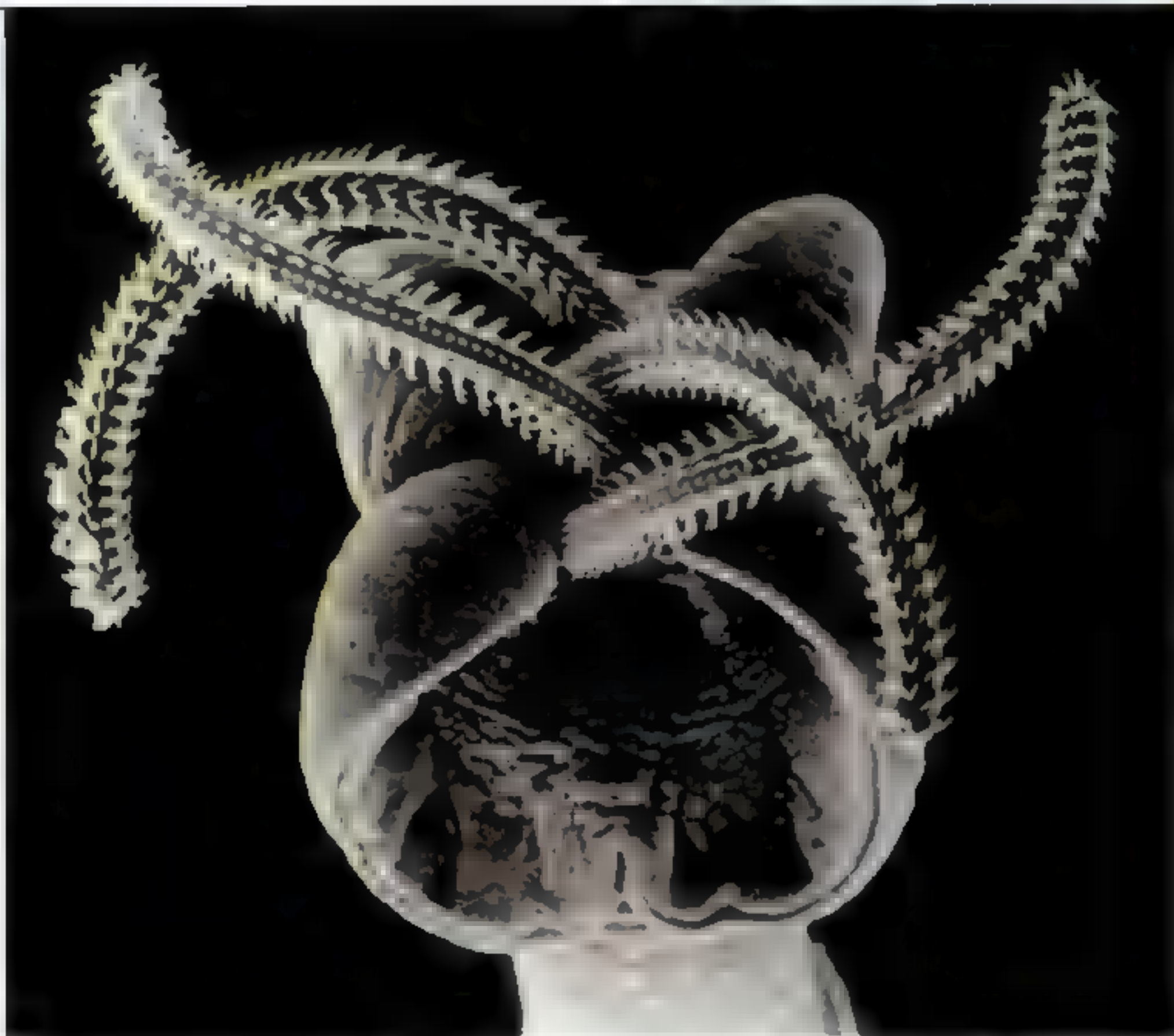
DRIVEN.

BIOLOGY

Worming In

Sticking it to sharks

They're tiny. They're hideous. And they're marvels of 200 million years of evolution. Shark tapeworms such as *Callitetrarhynchus gracilis*—here magnified 20 times larger than life—have lived in sharks for almost as long as sharks have lived on Earth. In fact, it's this shared history that's helped the worms become specialists. "Show me any tapeworm, and I can tell you what species of shark it came from," claims Janine Caira of the University of Connecticut, who admits that this skill isn't often called for at parties. The parasites first enter a shark as larvae, and as many as



JUAN CARVAJAL

3,000 may occupy a single host. But unlike human tapeworms, which can grow up to 30 feet long and cause illness or death, shark tapeworms are less than

two inches long and do little harm, leaving only tiny lesions where they've attached to the intestine. Says Caira, "No shark ever died from tapeworms."



ES H. NELSON

HEALTH

The Dog Diet

Your old dog may have new tricks in him yet. Research suggests that a diet rich in vitamins and antioxidants, combined with stimulating play, can slow or reverse some age-related

brain deterioration in dogs. Are there implications here for the battle against Alzheimer's disease? Could be.

"Dogs are a good model of human aging," says Bill Milgram, co-author of the study. "Their brains are similar to humans', and as dogs grow older, many of their behavioral changes are

close to our own." For aging dogs—and people—Milgram advocates diets rich in fruits and vegetables, supplemented with antioxidants and vitamins C and E. Also important: physically and mentally challenging activities. So when you take Rover to the park, pack a ball or a Frisbee—and do some fetching yourself.



CHARLES O'HEAR, IORRHS

CONSERVATION

Save the Corks

A wildlife-friendly crop?

Vintners now use plastic stoppers in more than 5 percent of their bottles, which may have a surprising impact on wildlife. Cork oaks are

grown on more than three million acres in Spain and Portugal. For centuries the trees have been tended by cork farmers, who harvest the bark about every nine years (above). Seldom disturbed, Iberian lynx, Spanish imperial eagles, and other wildlife have flourished among the trees. Now conservationists worry that more use of plastic may depress the

cork market, forcing cork farmers to turn to other crops that are more disruptive to wildlife. Britain's Royal Society for the Protection of Birds is asking both wine producers and consumers to help. Says spokesperson Hannah Bartram, "We want wine bottles to be labeled with the type of stopper used so buyers can make informed choices."

ECOLOGY

Outfoxed by Aliens

Talk about a domino effect: A bizarre series of events triggered by the invasion of alien species has jeopardized foxes in Channel Islands National Park off southern California.

Several islands, each with its own fox subspecies, have been overrun by pigs whose ancestors escaped from farms decades ago. After native bald eagles were wiped out by pesticides during the 1940s and '50s, golden eagles began cruising over from the mainland to prey on baby pigs. But the eagles also learned how



NICHOLAS DEVORE III, PHOTOGRAPHERS ASPLEN

easy the tiny island foxes are to kill (they're smaller than most house cats). The carcass of the last known wild fox on San Miguel—which in 1994 had about 450—was found last March.

Perhaps 60 of the foxes remain on Santa Cruz. "We're rounding them up to keep in a captive-breeding facility until we're

ready to restock the island," says park ecologist Gary Davis. "We're also reintroducing bald eagles, which don't eat foxes, and relocating golden eagles to the mainland." As for the pigs that started all the trouble, they're being fenced in and hunted down. Davis expects Santa Cruz to be pig free within six years.



It's easy to be green.

And it's easy to recycle your rechargeable batteries once they've served their purpose. The same is true for your mobile phones, PDAs, cordless power tools, walkie-talkies and remote control toys. To find the nearest collection site for your rechargeables, call 1-800-8-BATTERY or drop off your batteries by one of the listed national retailers. It's the green thing.

Recycle your rechargeable batteries.

RBRC Spokesperson Richard Karn,
"Al" from TV's *Home Improvement*



Drop off your rechargeable batteries at the following national retailers:

In the US:

Best Buy
Cellular One
Cingular
Circuit City
Home Depot
RadioShack
Sears
Target
Wal-Mart

In Canada:

Bell Mobility
Canadian Tire
Future Shop
Home Depot
Motorola Cellular Dealers
RadioShack Canada
Revy
Sears
Zellers

ADVERTISEMENT

advertiser.connections

Get more information from our advertising partners about the products and services they advertise in NATIONAL GEOGRAPHIC magazine. Remember, our advertisers help make possible the Society's mission of education, exploration and research. To find out more, point and click to the following URLs:

Allegra www.allegra.com

Canon www.canon.com

Council for Biotechnology

www.whybiotech.com

Encompass Insurance

www.encompassinsurance.com

Endless Pools

www.endlesspools.com

First USA www.firstusa.com

Flonase www.flonase.com

GlaxoSmithKline NicoDerm CQ

www.nicodermcq.com

Goodyear www.goodyear.com

Honda www.honda.com

Hummer www.hummer.com

Iams Company/Eukanuba

www.eukanuba.com

Land Rover www.landrover.com

Nature Valley Granola Bars

www.GeneralMills.com/NatureValley

Nissan www.nissandriven.com

Rechargeable Battery Recycling

Corporation www.rbrc.org

State Farm www.statefarm.com

TIAA CREF www.tiaa-cref.org

Transitions www.transitions.com

Tylenol PM www.tylenol.com

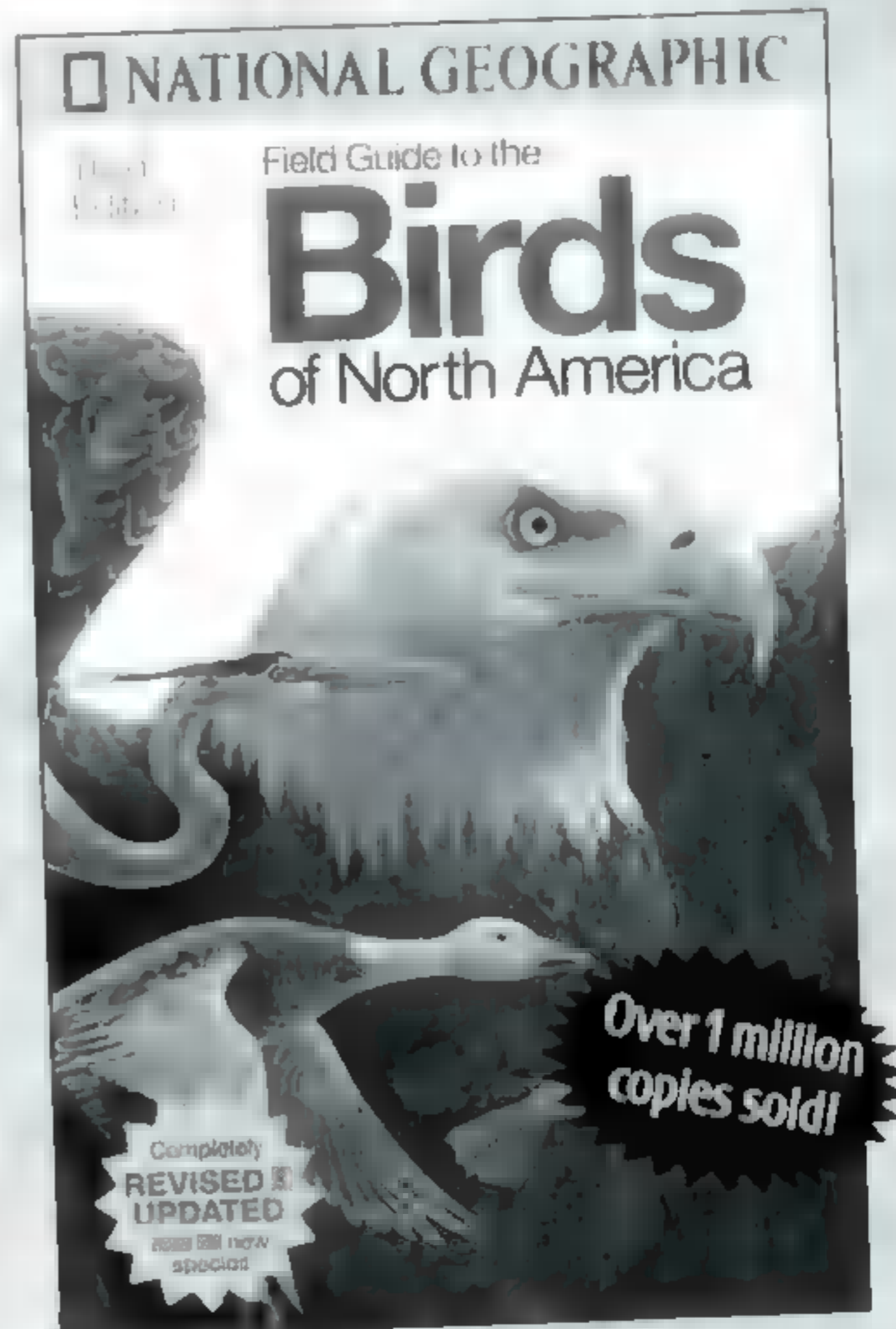
Vantage Press

www.vantagepress.com

For more information regarding National Geographic Society products, mission-related programs and membership to the National Geographic Society, log on to www.nationalgeographic.com.

If you love bird-watching,
you'll treasure the best-selling
National Geographic

Field Guide to the Birds of North America



Clear enough for beginners...detailed enough for experts.

- More than 800 fascinating bird descriptions.
- Superb paintings by avian artists depict more than 2,400 different plumages.
- More than 600 range maps.
- 482 information-packed pages, with sturdy sewn-through binding.

\$21.95*

Call Toll-Free
1-888-647-6733

*Tax will be added when applicable.
Please allow 30 days for delivery. ■ orders subject to approval.

BG200102

YES! I'd like to give a year of NATIONAL GEOGRAPHIC and a FREE D-Day Flag Poster...

Please begin a 12-month membership in the National Geographic Society, including subscription to the magazine and a **FREE D-Day Flag Poster**, for dues of \$34*...

as a gift. for myself. as a gift *and* for myself.

Check one: Bill me. Enclosed is my check for total dues of \$_____.

Make check payable to National Geographic Society and mail with this card to the Society at P.O. Box 63001, Tampa, FL 33663-3001.

MY NAME _____

Please print (Mr., Mrs., Miss, Ms.)

STREET _____

CITY _____

STATE _____

ZIP CODE _____

*Annual dues to the U.S., to Canada, \$38 (includes 7% GST); to all other countries, \$45. Please add sales tax for memberships sent to KY (6%) and VT (5%). Annual newsstand price is \$59.40 in the U.S. Life membership (available in U.S. only) is \$850. Life membership can be entered in one name only and is not transferable or refundable.

To U.S. and Canada, allow 4-6 weeks for delivery of first issue. Elsewhere, allow 8-12 weeks.

GIFT FOR _____

Please print (Mr., Mrs., Miss, Ms.)

STREET _____

CITY _____

STATE/PROVINCE _____

COUNTRY _____

ZIP/POSTAL CODE _____

Flag Poster (24" x 30") will be sent upon receipt of payment.

A gift card will be sent for you to personalize and present or mail to your recipient.

While all dues support the Society's mission of expanding geographic knowledge, 90 percent is designated for the magazine subscription, and no portion should be considered a charitable contribution.

Detach here. ▼

NGAVRE8



NATIONAL GEOGRAPHIC

It's not a magazine.
It's an adventure.
Share it with a friend.



**FREE
D-Day
Flag
Poster!**

Please begin a 12-month membership in the National Geographic Society, including subscription to the magazine and a **FREE D-Day Flag Poster**, for dues of \$34*...

as a gift. for myself. as a gift *and* for myself.

Check one: Bill me. Enclosed is my check for total dues of \$_____.

Make check payable to National Geographic Society and mail with this card to the Society at P.O. Box 63001, Tampa, FL 33663-3001.

MY NAME _____

Please print (Mr., Mrs., Miss, Ms.)

STREET _____

CITY _____

STATE _____

ZIP CODE _____

*Annual dues to the U.S., to Canada, \$38 (includes 7% GST); to all other countries, \$45. Please add sales tax for memberships sent to KY (6%) and VT (5%). Annual newsstand price is \$59.40 in the U.S. Life membership (available in U.S. only) is \$850. Life membership can be entered in one name only and is not transferable or refundable.

To U.S. and Canada, allow 4-6 weeks for delivery of first issue. Elsewhere, allow 8-12 weeks.

GIFT FOR _____

Please print (Mr., Mrs., Miss, Ms.)

STREET _____

CITY _____

STATE/PROVINCE _____

COUNTRY _____

ZIP/POSTAL CODE _____

Flag Poster (24" x 30") will be sent upon receipt of payment.

A gift card will be sent for you to personalize and present or mail to your recipient.

While all dues support the Society's mission of expanding geographic knowledge, 90 percent is designated for the magazine subscription, and no portion should be considered a charitable contribution.

NGAVRE8

Please print your full name and address.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 1600 TAMPA, FL

POSTAGE WILL BE PAID BY ADDRESSEE

NATIONAL GEOGRAPHIC SOCIETY
PO BOX 64116
TAMPA FL 33664-4116



Share the romance of NATIONAL GEOGRAPHIC!

Membership benefits include...

- 12 monthly issues of NATIONAL GEOGRAPHIC magazine
- FREE D-Day Flag Poster measuring 24" x 30"
- as many as five full-color wall maps in selected issues
- member discounts on Society books and products
- the satisfaction of knowing your dues help support worldwide scientific research, exploration, and geography education
- invitations to join National Geographic's video clubs.



♻ Recycled paper

Please print your full name and address.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

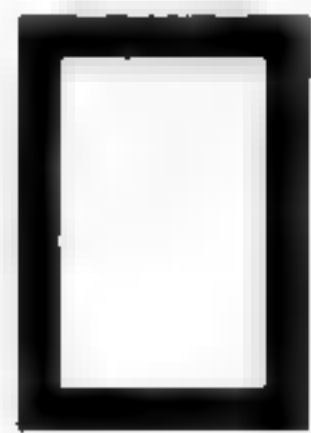
BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 1600 TAMPA, FL

POSTAGE WILL BE PAID BY ADDRESSEE

NATIONAL GEOGRAPHIC SOCIETY
PO BOX 64116
TAMPA FL 33664-4116





NATIONAL GEOGRAPHIC

Customer Service Information

Each individual who receives NATIONAL GEOGRAPHIC magazine is vitally important to us, and we've set up a number of ways to ensure your satisfaction.



ONLINE CUSTOMER SERVICE ngmservice.com



To change your address

Contact us with your new address 6 to 8 weeks prior to moving. Remember, the post office will forward mail for only 60 days following notification.

If you receive a bill after you've paid

Please disregard any bill or renewal notice received soon after mailing your payment or order. Our notices probably crossed in the mail. If you want to check your account status, visit online Customer Service.

If your issue is damaged or missing

Contact us by visiting online Customer Service. We'll replace the damaged/missing issue or extend your membership, whichever you prefer.

To know when your membership expires

Check your account status via online Customer Service. Also, the printed address information on every wrapper includes the date your membership will expire. This date appears as a month and year.

- Become a member ■ Give a gift
- Renew your membership ■ Order back issues



CONTACT US ONLINE

- ngmservice.com
- E-mail: ngsline@customersvc.com
- Visit our online "Frequently Asked Questions" at ngmservice.com

Contact us by e-mail with any questions about the Society or your membership account!



BY PHONE

In the U.S. and Canada, call toll free

1-800-NGS-LINE (1-800-647-5463)

Monday–Friday 8:00 a.m.–midnight ET,

Saturday 8:30 a.m.–7:00 p.m.

Outside the U.S. and Canada, call 1-813-979-6845,
or fax to 1-813-979-6831.

Behind the SCENES

AT THE NATIONAL GEOGRAPHIC SOCIETY



NATIONAL GEOGRAPHIC PHOTOGRAPHY BY WILLIAM ALBERT ALLARD

A Cowboy Goes to Iran

Geographic photos in groundbreaking exhibit

William Albert Allard's portrait of Arizona rancher Henry Gray (above) captures an enduring American icon: the cowboy. The photograph recently appeared in what most Americans would consider an unlikely place: Iran's Tehran Museum of Contemporary Art. An exhibit of 70 of Bill's portraits of Americans, along with 76 images culled from our book *National Geographic: The Photographs*, were part of the first major cultural exchange between the United States and Iran since the fall of the shah in 1979. The exhibit was a joint project of National Geographic's Explorers

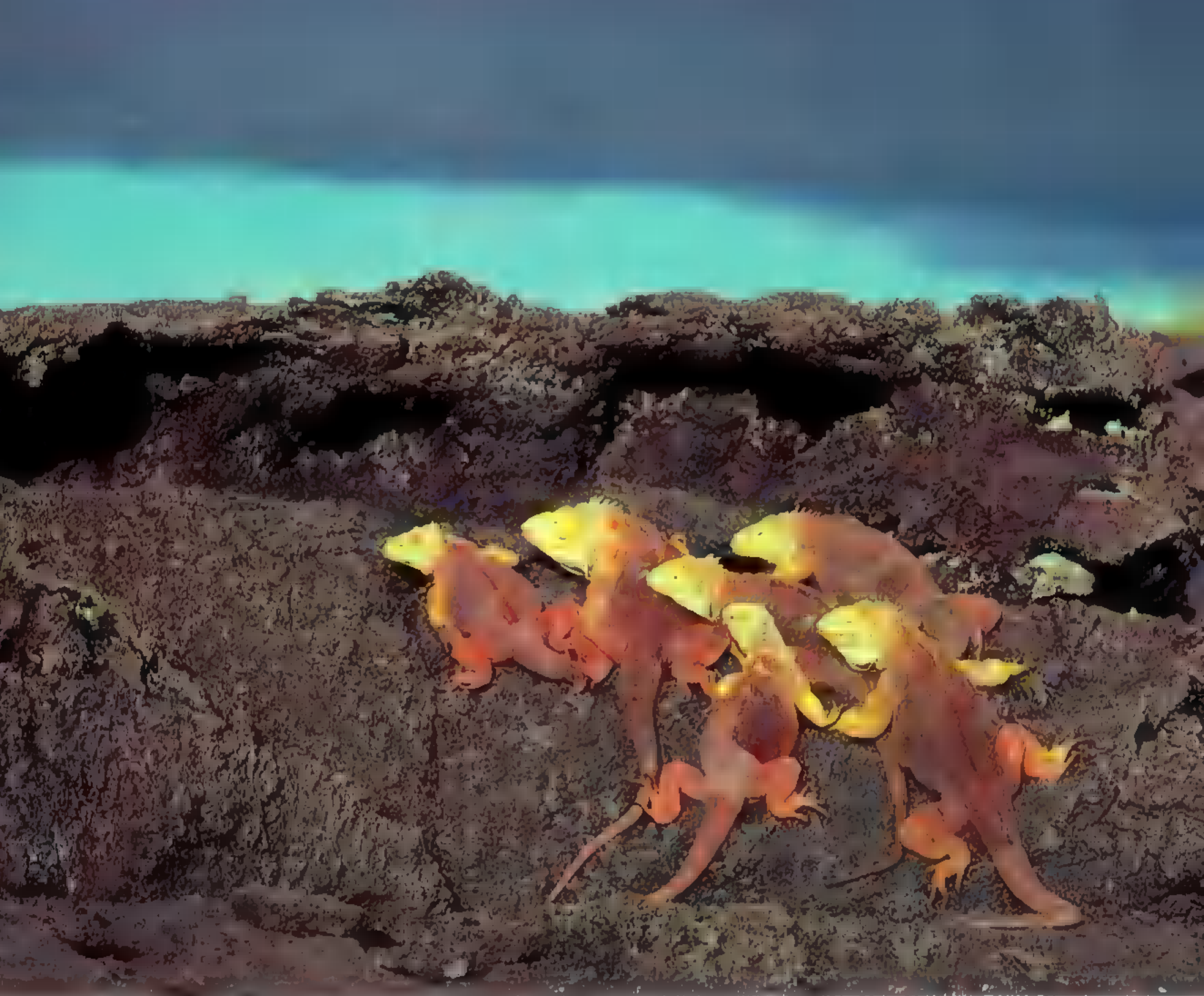
Hall and the Meridian International Center, a Washington-based organization.

At a time when many Iranians still call the U.S. the "Great Satan" and President Bush has named Iran as part of an "axis of evil," the show drew large crowds. Morteza Kazemi, Iran's deputy minister for culture, attended its opening, and the government's general director for music was drawn to Bill's portraits of blues musicians (he posed for pictures next to a photo of B. B. King). "All kinds of people visited—photographers, artists, university students, just ordinary people," says Nancy Matthews, vice

president of Meridian. "They were interested in seeing aspects of America they weren't familiar with: the Amish, for example, and baseball."

Attitudes about the U.S. remain polarized in Iran. The museum's collection holds works by American pop artists Roy Lichtenstein and Andy Warhol. Yet in the same city the former U.S. Embassy has been reopened as an anti-American museum.

Meridian had earlier brought to the U.S. "A Breeze from the Gardens of Persia: New Art from Iran," a show featuring the work of 54 contemporary Iranian artists—about a third of them women. It's still touring: If you miss it in Los Angeles this summer, you can catch it in Atlanta in the fall.



Photographed by Tim De Roy

WILDLIFE AS CANON SEES IT

On the volcanic island of Fernandina, a group of Galapagos land iguanas bask on a lava bed. On an extraordinary month-long journey, hundreds of the island's female iguanas cross miles of volcanic terrain to reach the summit rim or descend into the warm caldera, intent on digging a nest in the soft ash to bury their eggs. Three months later, tiny hatchlings emerge and disperse over the island. Here only natural predators are a threat, but on other islands land iguanas have been vulnerable to feral animals and altered habitat. Ongoing conservation programs and captive

breeding have been vital to keeping the Galapagos land iguanas secure.

As a global corporation committed to social and environmental concerns, we join in worldwide efforts to promote greater awareness of endangered species for the benefit of future generations.



Galapagos Land Iguana (*Crotaphytus sulcirostris*)
Size: Length, 35-60 cm; tail, similar to body size
Weight: 4-13.5 kg
Habitat: Drier habitat in Ecuador's Galapagos Islands
Surviving number: Estimated at fewer than 100,000. Stable populations occur on Fernandina and South Plazas; recovering on Santa Cruz and Baltra; threatened on Isabela; extinct on Santiago



DICK PERRI (LEFT); JAMES V. BULLARD

A Shared Attraction

Peace Corps volunteers come home to NGS

Parry Wilson had never been out of the U.S. until he went to a remote village in Honduras in 1985 as a Peace Corps volunteer (above left). He helped build houses, brought in an artisan to show residents how to market their crafts, helped start a food co-op. "The impact on me was lasting," says Parry, now a Society tax accountant. "I was taken into people's homes and got to see how they live."

Parry is one of more than 20 Society employees with Peace Corps backgrounds. They include Jim Bullard (above right), a teacher trainer in St. Lucia; Marisa Larson (right), who taught animal husbandry to Moroccan women; Karen Lange (left), who taught freshwater fish farming and algebra in Liberia; Carrie Regan (below left), a public health volunteer in Guinea; and Robin Freeman (below right), who taught school in Cameroon.



BLOCKER

All see a link between their service and NGS. "Peace Corps volunteers are attracted to the culture and geography of the world," Marisa says. "That's what the National Geographic Society deals with every day."



KAREN E. LANGE



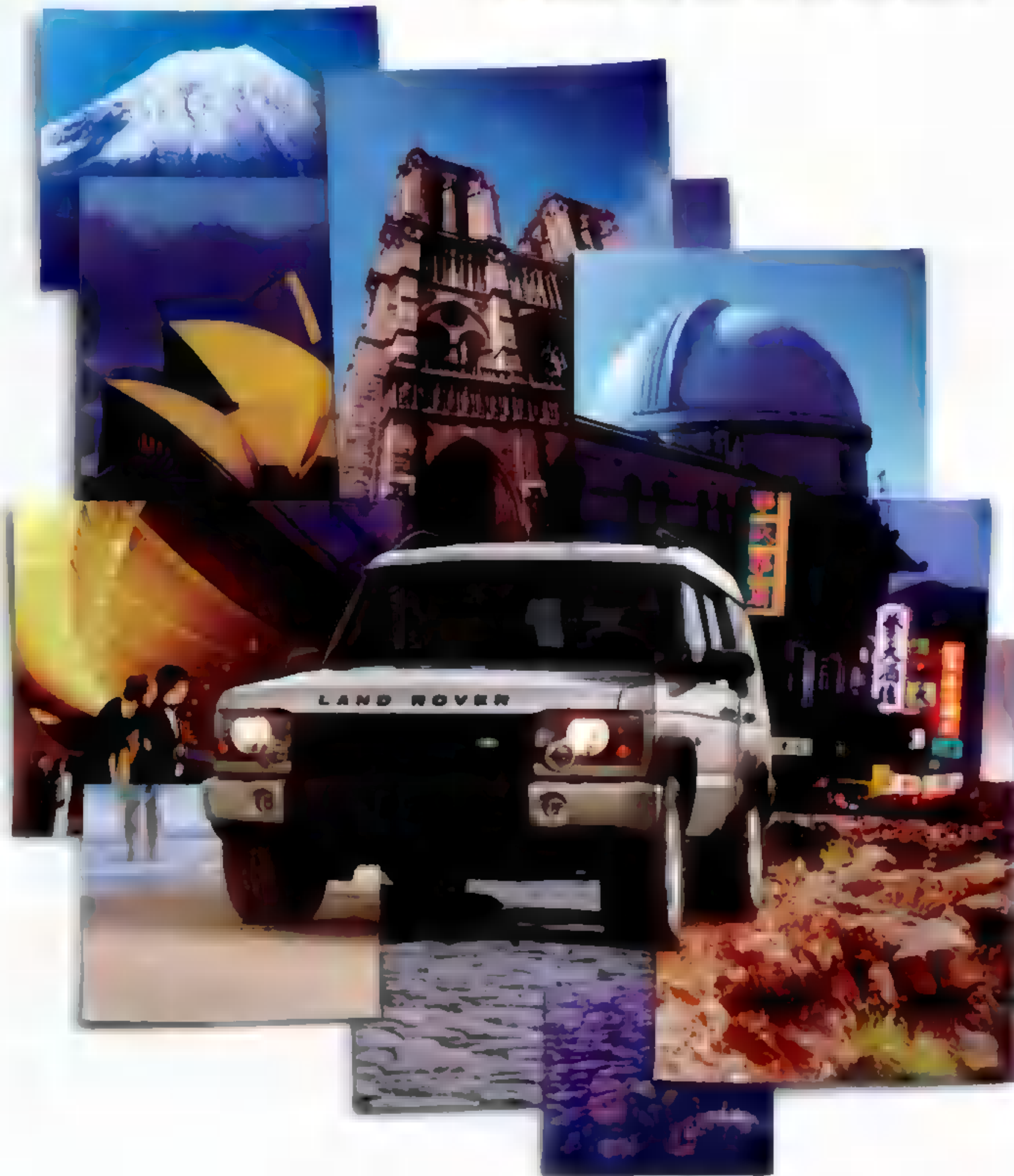
MAGASSOUBA



FREEMAN

THE NEW DISCOVERY.

IT'S A WHOLE NEW WAY TO SEE THE WORLD.



The 2003 Land Rover Discovery. Nicely equipped from \$34,995.

With a more powerful 4.6L V8 engine, all-new front-end styling and a more refined suspension, the new Discovery is thoroughly equipped to show you the world. And with all-new interior color themes, complimentary scheduled maintenance, available satellite navigation, DVD system and rear park distance control, it could easily change your view of it as well. The new Discovery from Land Rover.

The most well-traveled vehicles on earth.



SPECIAL EDITION POSTER



National emblem of the United States, the bald eagle ■ making ■ robust recovery in the lower 48. Celebrate its comeback with ■ special edition poster of Norbert Rosing's photograph, featured on pages 34-5 in the July issue. The poster is available for \$39.95 plus \$6.95 for postage and handling (\$9.95 for international orders). Please add the appropriate sales tax for orders sent to CA, DC, FL, KY, MI, PA, VA, VT, and Canada. We will produce only as many 24-by-30-inch posters ■ we receive orders for by August 31, 2002. Each will be hand-numbered and embossed with the Society seal. Shipping is scheduled for October 2002. Call toll free: 1-888-647-7301 (outside the U.S. and Canada call 1-515-362-3353).

MORE INFORMATION

Call: 1-800-NGS-LINE
 (1-800-647-5463) Toll free from U.S., Canada, 8 a.m.-midnight ET, Mon.-Fri. 8:30 a.m.-7 p.m. ET, Sat.
For a free catalog call: 1-800-447-0647
 Special device for the hearing-impaired (TDD) 1-800-548-9797
Write: National Geographic Society
 PO Box 98199
 Washington, DC 20090-8199
Online: nationalgeographic.com/ngm
AOL Keyword: NatGeoMag



GEORGE KHAYCHYK

Major Stars Shine for NGS

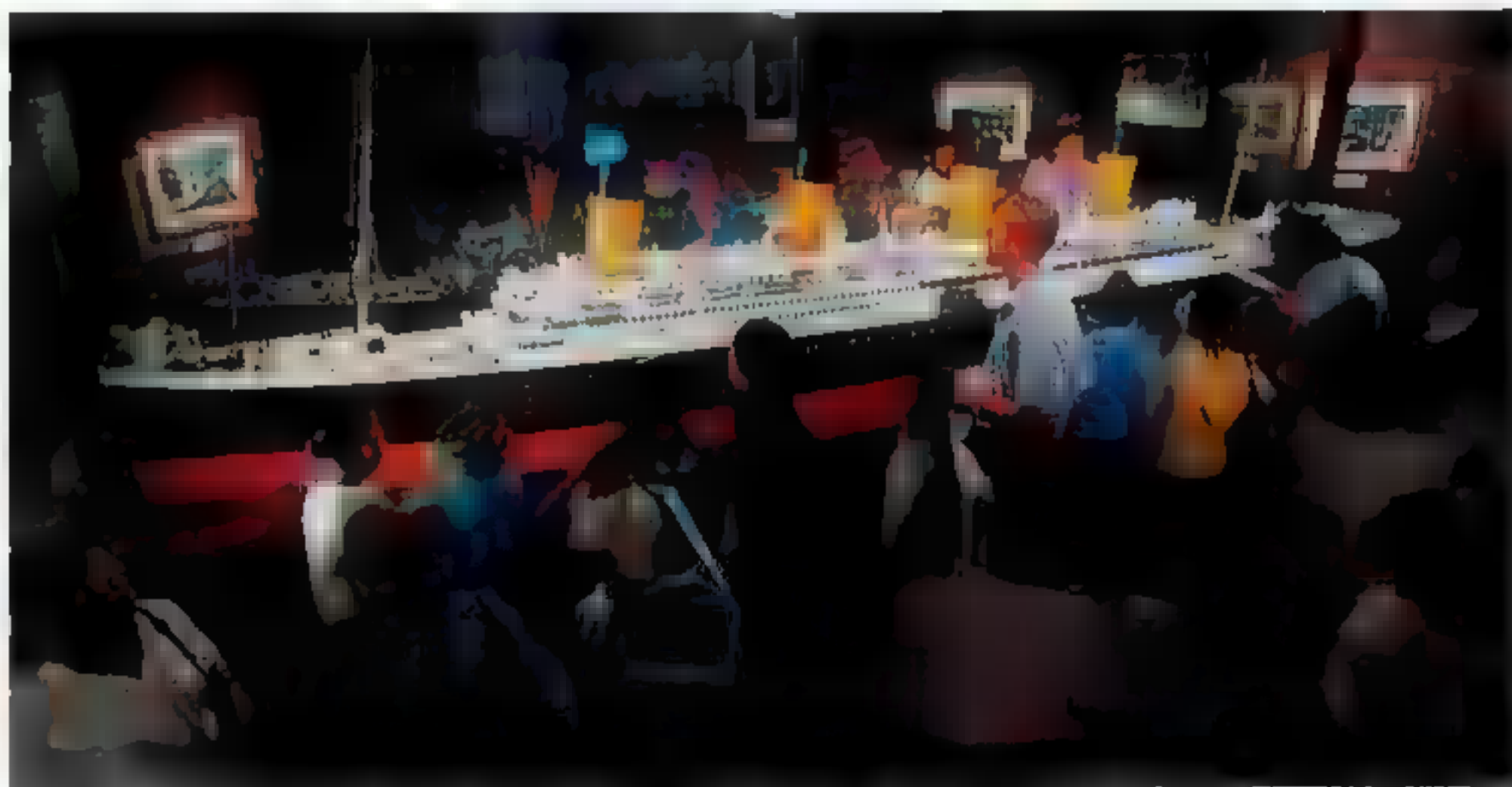
A feature film debut

Now playing: The first feature film ever to bear the Society's imprint, *K-19: The Widowmaker*, starring Harrison Ford (above, at right) and Liam Neeson, at left.

Inspired by actual Cold War events, *K-19* tells the tale of a Soviet nuclear submarine whose reactor fails during a patrol in

1961. The sub's captain (Ford) is forced to choose between following orders and saving his men.

Ford turns out to have a keen eye for detail—and so does Christine Whitaker, head of our new Feature Films division, which produced the Paramount and Intermedia release, directed by Kathryn Bigelow. "We met with officials from the Russian Navy in Moscow," says Whitaker. "We leased a Cold War era sub similar to *K-19*, and it was Ford's idea to retrofit it with a larger conning tower and extended tail to make it an exact model."



NATIONAL GEOGRAPHIC PHOTOGRAPHER THE SS EN

Supermodels

Coming to Washington, D.C., before September 2? Stop in at Explorers Hall in the Society's headquarters and check out models of some of history's best known ships, including this stupendous 18-foot-long

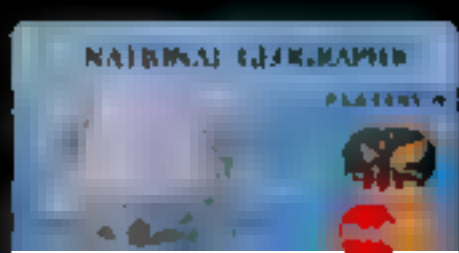
Titanic (above), rendered in exquisite detail. Based on plans provided by the firm that built the *Titanic*, it includes some three million hand-installed rivets. Also on display: models of the *Bismarck*, the battleships *Arizona* and *Missouri*, and polar explorer Ernest Shackleton's *Endurance*.

BORN TO EXPLORE

© 2002 National Geographic Society. Photo by Harald Sund.

ALL CREDIT CARDS WERE BORN TO SHOP. ONLY ONE WAS BORN TO EXPLORE.

With the National Geographic Platinum MasterCard® you not only receive a world of benefits, you help support our non-profit mission of exploration, conservation, research, and education. To enjoy no annual fee, up to \$1,000,000 travel accident insurance, and worldwide emergency travel services, call 1.800.731.2253 to apply.



nationalgeographic.com



Back to School

Do your kids need fun math help? Try the award-winning NGS education website. Thousands of teachers do, and here

are a few reasons why: printer-friendly maps, games, activities, and a book club where children can design and print

their own bookmarks, flashcards (and give off a little time) at nationalgeographic.com/education.

PHOTO: MICHAEL O'NEILL/AP PHOTO/TELEGRAPH HEALD

Useful Tools

■ **BREAKING NEWS**

Get news of the natural world at nationalgeographic.com/news

■ **E-MAIL NEWSLETTERS**

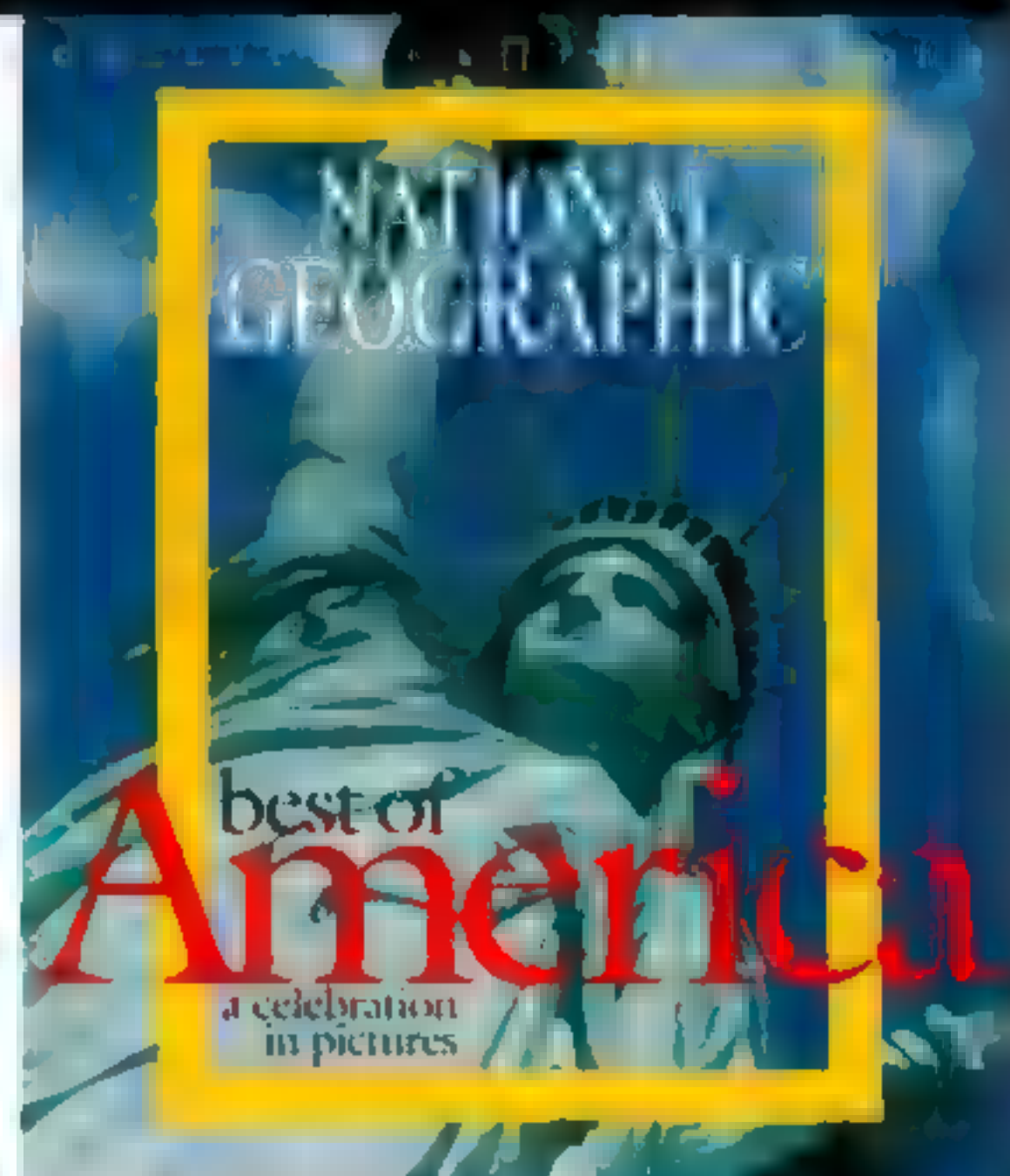
Sign up for newsletters on photography, travel, maps, and more at nationalgeographic.com/register.html

■ **PHOTO OF THE DAY**

Get your daily photo fix at nationalgeographic.com/photography_today

Stars & Stripes

This extraordinary collection of American images just landed on newsstands. Download photographs to decorate your desktop, and order a copy of *Best of America* at nationalgeographic.com/ngm/best_america. Then write your own captions to featured photos and e-mail them to friends.



DAVID S. ROYER

E-mail online@nationalgeographic.com National Geographic Store nationalgeographic.com/store E-mail Newsletter Register at nationalgeographic.com/register.html Member Services E-mail ngsline@customersvc.com AOL Keyword: NatGeo

SIMPLICITY
is the best

POLICY

Honestly.

ONE INDEPENDENT AGENT to recommend the best coverage for your needs. ONE POLICY to protect your home, your auto and your other valuable belongings. ONE NUMBER to call for 24-hour claims service. Find out how Encompass can make

your life simpler (at least when it comes to insurance). Ask your Independent Insurance Agent today.

To find THE AGENT NEAREST YOU call TOLL-FREE 1-866-760-6050 or visit encompassinsurance.com/info



LIBERTY, JUSTICE, AND REALLY GOOD INSURANCE™

National Geographic TV



NATIONAL GEOGRAPHIC CHANNEL

Wild Dog Days

No tame walk in the park here. A pair of young African wild dogs in Botswana's Okavango Delta approach their mother's den to play with

juniper siblings. *Living Wild's* canine film marathon unleashes coyotes from Yellowstone, jackals from Tanzania, and dingoes from Australia.

With the cinematography of a pack hunt, see close-ups of pit-training, and learn what it takes to be the big dog—aka a male.

CHIRY (THIS), NGS (ABOVE) |  SHADRACK SMITH (NEXT)



NATIONAL GEOGRAPHIC EXPLORER, MSNBC

Fearless

"I like getting close to my subjects," says EXPLORER filmmaker Kevin Krug. Producing *Crocodiles of the Orinoco* put Krug a few jaw lengths away from feeding caimans. He has climbed a tree full of vampire bats and faced a raging bush-fire. "I don't see myself as an adrenaline junkie," he says, "but it's almost always worth it to get to the epicenter of what's happening."

National Geographic EXPLORER, MSNBC, Sundays, 8 P.M. ET/5 P.M. PT. National Geographic Specials PBS. See local listings. National Geographic Videos, Kids Videos, and DVDs Call 1-800-827-5182. National Geographic Channel Call your cable or satellite provider.

■ Programming information accurate at press time; consult local listings or our website at nationalgeographic.com

Are you or someone you care for increasingly...

Forgetful?

Repeating questions?

**Having trouble
finding words?**



**When these problems interfere with everyday life,
it could be Alzheimer's disease.**

A medicine called ARICEPT® may help.

When you or someone you care for has gradually increasing memory problems, it may not be normal aging. It could be Alzheimer's disease, an incurable, progressive illness.

Today there's hope, including a prescription medicine called ARICEPT®. Once-daily ARICEPT® is clinically proven to treat the symptoms of mild to moderate Alzheimer's. In people who respond to ARICEPT®, symptoms may get better, stay the same or progress at a slower rate.

ARICEPT® is well tolerated but may not be for everyone. Some people may experience nausea, diarrhea, insomnia, vomiting, muscle cramps, fatigue or loss of appetite. In studies, these side effects were usually mild and temporary. Some people taking ARICEPT® may experience fainting. People at risk for ulcers should tell their doctors because their condition may get worse.

Only a doctor can say if memory problems are due to Alzheimer's disease. And the sooner you know, the sooner ARICEPT™ may help. So speak to a doctor today and ask about ARICEPT®, the #1 prescribed medicine for Alzheimer's disease.

SEE A DOCTOR AND ASK ABOUT

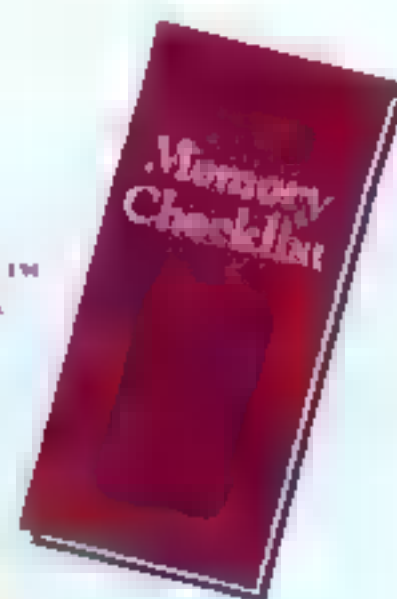
**ONCE-A-DAY
ARICEPT®**
(donepezil HCl)
5 MG AND 10 MG TABLETS

MEDICINE TO REMEMBER™

*To learn more and to receive
a memory checklist, call*

800-760-6029 ext. 55

Please see additional important product information on accompanying page.



ONCE-A-DAY
ARICEPT (donepezil HCl) 5-MG AND 10-MG TABLETS
MEDICINE TO REMEMBER™

ARICEPT™ (Donepezil Hydrochloride Tablets)

Brief Summary—see package insert for full prescribing information. **INDICATIONS AND USAGE** ARICEPT™ is indicated for the treatment of mild to moderate dementia of the Alzheimer's type. **CONTRAINDICATIONS** ARICEPT™ is contraindicated in patients with known hypersensitivity to donepezil hydrochloride or to piperidine derivatives. **WARNINGS** **Anesthesia:** ARICEPT™, as a cholinesterase inhibitor, is likely to exaggerate succinylcholine-type muscle relaxation during anesthesia. **Cardiovascular Conditions:** Because of their pharmacological action, cholinesterase inhibitors may have vagotonic effects on the sinoatrial and atrioventricular nodes. This effect may manifest as bradycardia or heart block in patients both with and without known underlying cardiac conduction abnormalities. Syncope episodes have been reported in association with the use of ARICEPT™. **Gastrointestinal Conditions:** Through their primary action, cholinesterase inhibitors may be expected to increase gastric acid secretion due to increased cholinergic activity. Therefore, patients should be monitored closely for symptoms of active or occult gastrointestinal bleeding, especially those at increased risk for developing ulcers, e.g., those with a history of ulcer disease or those receiving concurrent nonsteroidal anti-inflammatory drugs (NSAIDs). Clinical studies of ARICEPT™ have shown no increase, relative to placebo, in the incidence of either peptic ulcer disease or gastrointestinal bleeding. ARICEPT™, as a predictable consequence of its pharmacological properties, has been shown to produce diarrhea, nausea and vomiting. These effects, when they occur, appear more frequently with the 10 mg/day dose than with the 5 mg/day dose. In most cases, these effects have been mild and transient, sometimes lasting one to three weeks, and have resolved during continued use of ARICEPT™. **Genitourinary:** Although not observed in clinical trials of ARICEPT™, cholinomimetics may cause bladder outflow obstruction. **Neurological Conditions:** Seizures: Cholinomimetics are believed to have some potential to cause generalized convulsions. However, seizure activity also may be a manifestation of Alzheimer's Disease. **Pulmonary Conditions:** Because of their cholinomimetic actions, cholinesterase inhibitors should be prescribed with care to patients with a history of asthma or obstructive pulmonary disease. **PRECAUTIONS** **Drug-Drug Interactions** **Drugs Highly Bound to Plasma Proteins:** Drug displacement studies have been performed *in vitro* between this highly bound drug (96%) and other drugs such as furosemide, digoxin, and warfarin. ARICEPT™ at concentrations of 0.3-10 µg/mL did not affect the binding of furosemide (5 µg/mL), digoxin (2 ng/mL), and warfarin (3 µg/mL) to human albumin. Similarly, the binding of ARICEPT™ to human albumin was not affected by furosemide, digoxin, and warfarin. **Effect of ARICEPT™ on the Metabolism of Other Drugs:** No *in vivo* clinical trials have investigated the effect of ARICEPT™ on the clearance of drugs metabolized by CYP 3A4 (e.g., cisapride, terfenadine) or by CYP 2D6 (e.g., imipramine). However, *in vitro* studies show a low rate of binding to these enzymes (mean K_i about 50-130 µM), that, given the therapeutic plasma concentrations of donepezil (164 nM), indicates little likelihood of interference. Whether ARICEPT™ has any potential for enzyme induction is not known. **Effect of Other Drugs on the Metabolism of ARICEPT™:** Ketoconazole and quinidine, inhibitors of CYP450, 3A4 and 2D6, respectively, inhibit donepezil metabolism *in vitro*. Whether there is a clinical effect of these inhibitors is not known. Inducers of CYP 2D6 and CYP 3A4 (e.g., phenytoin, carbamazepine, dexamethasone, rilampin, and phenobarbital) could increase the rate of elimination of ARICEPT™. **Use with Anticholinergics:** Because of their mechanism of action, cholinesterase inhibitors have the potential to interfere with the activity of anticholinergic medications. **Use with Cholinomimetics and Other Cholinesterase Inhibitors:** A synergistic effect may be expected when cholinesterase inhibitors are given concurrently with succinylcholine, similar neuromuscular blocking agents or cholinergic agonists such as bethanechol. **Carcinogenesis, Mutagenesis, Impairment of Fertility** Carcinogenicity studies of donepezil have not been completed. Donepezil was not mutagenic in the Ames reverse mutation assay in bacteria. In the chromosome aberration test in cultures of Chinese hamster lung (CHL) cells, some clastogenic effects were observed. Donepezil was not clastogenic in the *in vivo* mouse micronucleus test. Donepezil had no effect on fertility in rats at doses up to 10 mg/kg/day (approximately 8 times the maximum recommended human dose on a mg/m² basis). **Pregnancy** **Pregnancy Category C:** Teratology studies conducted in pregnant rats at doses up to 16 mg/kg/day (approximately 13 times the maximum recommended human dose on a mg/m² basis) and in pregnant rabbits at doses up to 10 mg/kg/day (approximately 16 times the maximum recommended human dose on a mg/m² basis) did not disclose any evidence for a teratogenic potential of donepezil. However, in a study in which pregnant rats were given up to 10 mg/kg/day (approximately 8 times the maximum recommended human dose on a mg/m² basis) from day 17 of gestation through day 20 postpartum, there was a slight increase in still births and a slight decrease in pup survival through day 4 postpartum at this dose; the next lower dose tested was 3 mg/kg/day. There are no adequate or well-controlled studies in pregnant women. ARICEPT™ should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. **Nursing Mothers** It is not known whether donepezil is excreted in human breast milk. ARICEPT™ has no indication for use in nursing mothers. **Pediatric Use** There are no adequate and well-controlled trials to document the safety and efficacy of ARICEPT™ in any illness occurring in children. **ADVERSE REACTIONS** **Adverse Events Leading to Discontinuation** The rates of discontinuation from controlled clinical trials of ARICEPT™ due to adverse events for

Table 1. Most Frequent Adverse Events Leading to Withdrawal from Controlled Clinical Trials by Dose Group

Dose Group	Placebo	5 mg/day ARICEPT™	10 mg/day ARICEPT™
Patients Randomized	355	350	315
Event/%Discontinuing			
Nausea	1%	1%	1%
Diarrhea	0%	1%	3%
Vomiting	1%	1%	2%

the ARICEPT™ 5 mg/day treatment groups were comparable to those of placebo-treatment groups at approximately 5%. The rate of discontinuation in patients who received 7-day escalations from 5 mg/day to 10 mg/day was higher at 13%. The most common adverse events leading to discontinuation, defined as those occurring in at least 2% of patients and at twice the incidence seen in placebo patients, are shown in Table 1.

Most Frequent Adverse Clinical Events Seen in Association with the Use of ARICEPT™ The most common adverse events, defined as those occurring at a frequency of at least 5% in patients receiving 10 mg/day and twice the placebo rate, are largely predicted by ARICEPT™'s cholinomimetic effects. These include nausea, diarrhea, insomnia, vomiting, muscle cramp, fatigue and anorexia. These adverse events were often of mild intensity and transient, resolving during continued ARICEPT™ treatment without the need for dose modification. There is evidence to suggest that the frequency of these common adverse events may be affected by the rate of titration. An open-label study was conducted with 269 patients who received placebo in the 15- and 30-week studies. These patients were titrated to a dose of 10 mg/day over a 6-week period. The rates of common adverse events were lower than those seen in patients titrated to 10 mg/day over one week in the controlled clinical trials and were comparable to those seen in patients on 10 mg/day. See Table 2 for a comparison of the most common adverse events following one and six week titration regimens.

Table 2. Comparison of Rates of Adverse Events in Patients Titrated to 10 mg/day Over 1 and 6 Weeks

Adverse Event	No titration		One-week titration		Six-week titration	
	Placebo (n=315)	5 mg/day (n=311)	10 mg/day (n=315)	10 mg/day (n=269)	10 mg/day (n=315)	10 mg/day (n=269)
Nausea	6%	5%	19%	6%	19%	6%
Diarrhea	5%	8%	15%	9%	15%	9%
Insomnia	6%	6%	14%	6%	14%	6%
Fatigue	3%	4%	8%	3%	8%	3%
Vomiting	3%	3%	5%	5%	5%	5%
Muscle cramps	2%	6%	8%	3%	8%	3%
Anorexia	2%	3%	7%	3%	7%	3%

Adverse Events Reported in Controlled Trials The events cited reflect experience gained under closely monitored conditions of clinical trials in a highly selected patient population. In actual clinical practice or in other clinical trials, these frequency estimates may not apply, as the conditions of use, reporting behavior, and the kinds of patients treated may differ. Table 3 lists

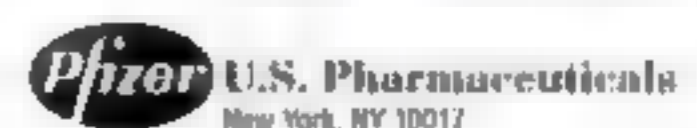
treatment emergent signs and symptoms that were reported in at least 2% of patients in placebo-controlled trials who received ARICEPT™ and for which the rate of occurrence was greater for ARICEPT™ assigned than placebo assigned patients. In general, adverse events occurred more frequently in female patients and with advancing age.

Table 3. Adverse Events Reported in Controlled Clinical Trials in at Least 2% of Patients Receiving ARICEPT™ (donepezil HCl) and at a Higher Frequency than Placebo-treated Patients

Body System/Adverse Event	Placebo (n=355)	ARICEPT™ (n=747)
Percent of Patients with any Adverse Event	72	74
Body as a Whole		
Headache	9	10
Pain, various locations	8	9
Accident	6	7
Fatigue	3	5
Cardiovascular System		
Syncope	1	2
Digestive System		
Nausea	6	11
Diarrhea	5	10
Vomiting	3	5
Anorexia	2	4
Hemic and Lymphatic System		
Echymosis	3	4
Metabolic and Nutritional Systems		
Weight Decrease	1	3
Musculoskeletal System		
Muscle Cramps	2	6
Arthritis	1	2
Nervous System		
Insomnia	6	9
Dizziness	6	8
Depression	1	3
Abnormal Dreams	0	3
Somnolence	1	2
Urogenital System		
Frequent Urination	1	2

Other Adverse Events Observed During Clinical Trials ARICEPT™ has been administered to over 1700 individuals during clinical trials worldwide. Approximately 1200 of these patients have been treated for at least 3 months and more than 1000 patients have been treated for at least 6 months. Controlled and uncontrolled trials in the United States included approximately 900 patients. In regards to the highest dose of 10 mg/day, this population includes 650 patients treated for 3 months, 475 patients treated for 6 months and 116 patients treated for over 1 year. The range of patient exposure is from 1 to 1214 days. Treatment emergent signs and symptoms that occurred during 3 controlled clinical trials and two open-label trials in the United States were recorded as adverse events by the clinical investigators using terminology of their own choosing. To provide an overall estimate of the proportion of individuals having similar types of events, the events were grouped into a smaller number of standardized categories using a modified COSTART dictionary and event frequencies were calculated across all studies. These categories are used in the listing below. The frequencies represent the proportion of 900 patients from these trials who experienced that event while receiving ARICEPT™. All adverse events occurring at least twice are included, except for those already listed in Tables 2 or 3. COSTART terms too general to be informative, or events less likely to be drug caused, are classified by body system and listed using the following definitions: **frequent adverse events**—those occurring in at least 1/100 patients; **infrequent adverse events**—those occurring in 1/100 to 1/1000 patients. These adverse events are not necessarily related to ARICEPT™ treatment and in most cases were observed at a similar frequency in placebo-treated patients in the controlled studies. No important additional adverse events were seen in studies conducted outside the United States. **Body as a Whole:** Frequent influenza, chest pain, toothache; **Infrequent:** fever, edema face, periorbital edema, hema facial, abscess, cellulitis, chills, generalized coldness, head fullness, listlessness; **Cardiovascular System:** Frequent hypertension, vasodilation, atrial fibrillation, hot flashes, hypotension; **Infrequent:** angina pectoris, postural hypotension, myocardial infarction, AV-block (first degree), heart failure, arteritis, bradycardia, peripheral vascular disease, supraventricular tachycardia, deep vein thrombosis; **Digestive System:** Frequent fecal incontinence, gastrointestinal bleeding, bloating, epigastric pain, **Infrequent:** eructation, gingivitis, increased appetite, flatulence, periodontal abscess, cholelithiasis, diverticulitis, drooling, dry mouth, fever sore, gastritis, irritable colon, tongue edema, epigastric distress, gastroenteritis, increased transaminases, hemorrhoids, icus, increased thirst, jaundice, melena, polydipsia, duodenal ulcer, stomach ulcer; **Endocrine System:** Infrequent diabetes mellitus, goiter; **Hemic and Lymphatic System:** Infrequent anemia, thrombocytopenia, thrombocytopenia, eosinophilia, erythrocytopenia; **Metabolic and Nutritional Disorders:** Frequent dehydration; Infrequent gout, hypokalemia, increased creatine kinase, hyperglycemia, weight increase, increased lactate dehydrogenase; **Musculoskeletal System:** Frequent bone fracture, **Infrequent:** muscle weakness, muscle fasciculation; **Nervous System:** Frequent delusions, tremor, irritability, paresthesia, aggression, vertigo, ataxia, increased libido, restlessness, abnormal crying, nervousness, aphasia; **Infrequent:** cerebrovascular accident, intracranial hemorrhage, transient ischemic attack, emotional lability, neuralgia, coldness (localized), muscle spasm, dysphoria, gall abnormality, hypertension, hypokinesia, neurodermatitis, numbness (localized), paranoia, dysarthria, dysphasia, hostility, decreased libido, melancholia, emotional withdrawal, nystagmus, pacing; **Respiratory System:** Frequent dyspnea, sore throat, bronchitis; **Infrequent:** epistaxis, post nasal drip, pneumonia, hyperventilation, pulmonary congestion, wheezing, hypoxia, pharyngitis, pleurisy, pulmonary collapse, sleep apnea, snoring; **Skin and Appendages:** Frequent pruritus, diaphoresis, urticaria; **Infrequent:** dermatitis, erythema, skin discoloration, hyperkeratosis, alopecia, fungal dermatitis, herpes zoster, hirsutism, skin striae, night sweats, skin ulcer; **Special Senses:** Frequent cataract, eye irritation, vision blurred; **Infrequent:** dry eyes, glaucoma, earache, tinnitus, blepharitis, decreased hearing, retinal hemorrhage, vitis externa, otitis media, bad taste, conjunctival hemorrhage, ear buzzing, motion sickness, spots before eyes; **Urogenital System:** Frequent urinary incontinence, nocturia; **Infrequent:** dysuria, hematuria, urinary urgency, metrorrhagia, cystitis, enuresis, prostatic hypertrophy, pyelonephritis, inability to empty bladder, breast fibroadenosis, fibrocystic breast, mastitis, pyuria, renal failure, vaginitis. **Postintroduction Reports** Voluntary reports of adverse events temporally associated with ARICEPT™ that have been received since market introduction that are not listed above, and that there is inadequate data to determine the causal relationship with the drug include the following: abdominal pain, agitation, cholecystitis, confusion, convulsions, hallucinations, heart block (all types), hemolytic anemia, hepatitis, hyponatremia, neuroleptic malignant syndrome, pancreatitis, and rash. **OVERDOSAGE** Because strategies for the management of overdose are continually evolving, it is advisable to contact a Poison Control Center to determine the latest recommendations for the management of an overdose of any drug. As in any case of overdose, general supportive measures should be utilized. Overdosage with cholinesterase inhibitors can result in cholinergic crisis characterized by severe nausea, vomiting, salivation, sweating, bradycardia, hypotension, respiratory depression, collapse and convulsions. Increasing muscle weakness is a possibility and may result in death if respiratory muscles are involved. Tertiary anticholinergics such as atropine may be used as an antidote for ARICEPT™ overdose. Intravenous atropine sulfate titrated to effect is recommended: an initial dose of 1.0 to 2.0 mg IV with subsequent doses based upon clinical response. Atypical responses in blood pressure and heart rate have been reported with other cholinomimetics when co-administered with quaternary anticholinergics such as glycopyrrolate. It is not known whether ARICEPT™ and/or its metabolites can be removed by dialysis (hemodialysis, peritoneal dialysis, or hemofiltration). Dose-related signs of toxicity in animals included reduced spontaneous movement, prone position, staggering gait, lacrimation, clonic convulsions, depressed respiration, salivation, miosis, tremors, fasciculation and lower body surface temperature.

2001/76 Revised December 2000



ARICEPT™ is a registered trademark of Eisai Co., Ltd.
© 2002 Eisai Inc. and Pfizer Inc. All rights reserved.

If You Own a Home with EIFS Synthetic Stucco

Please Read this Legal Notice – It May Affect Your Rights

If you have an Exterior Insulation and Finish System (“EIFS”) or components sold by Dryvit Systems, Inc., your rights may be affected by a national settlement of a class action lawsuit, *Posey v. Dryvit Systems*, Case No. 17,715-IV pending in the Circuit Court for Jefferson County, Tennessee at Dandridge.

What is the Lawsuit About?

Plaintiffs allege, among other things, that Dryvit EIFS is defective because it entraps water introduced into the exterior wall resulting in potential damage to homes. The lawsuit seeks monetary relief from Dryvit. Dryvit denies Plaintiffs’ claims and allegations. The Court has not ruled on the merits of the Plaintiffs’ claims, or on defenses asserted by Dryvit.

Who is Covered by the Proposed Settlement?

The Settlement encompasses all persons or entities who, as of June 5, 2002, owned a one- or two-family residential dwelling or townhouse in any State other than North Carolina, clad, in whole or in part, with Dryvit EIFS installed after January 1, 1989.

Persons who prior to June 5, 2002 have settled with Dryvit, providing a release of claims relating to Dryvit EIFS, or have obtained a judgment against Dryvit for a Dryvit EIFS claim, or had a final judgment entered against them on such claim in Dryvit’s favor are not included in the Settlement Class.

What is Dryvit EIFS?

Dryvit EIFS is a multi-layered exterior wall system consisting of a finish coat, a base coat, reinforcing mesh, adhesive and insulation board all of which are secured to some form of substrate. Dryvit EIFS was sold under the trade names Dryvit Outsulation[®] and Dryvit Sprint[®]. For purposes of the Settlement, Dryvit EIFS includes Dryvit Fastrak I[®], Fastrak II[®] and Fastrak 4000[®] systems. Dryvit EIFS is designed to look like traditional stucco.

How Do I Know if I Have Dryvit EIFS on my Property?

Documents—such as a warranty, correspondence, or bill of sale—may indicate that Dryvit EIFS is on your property. You may also contact your builder, contractor or EIFS applicator.

What are the Terms of the Settlement?

Benefits include free property inspections, a Dryvit Settlement Program Three-Year Limited Warranty (“the MoistureFree Warranty”), and cash contributions towards certain repair costs. To obtain benefits of the Settlement, Class Members must file a completed Claim Form, which includes information about the EIFS used on their property, by **December 5, 2003**.

After initial product identification, an Independent Inspector will inspect the property and issue an Inspection Report confirming or rejecting the initial product identification and identifying repairs, if any, that are necessary to obtain the MoistureFree Warranty. If the property is clad with Dryvit EIFS, then the Inspection Report will also include an Estimated Repair Cost Report, which estimates the cost of repairs, if any, that must be completed prior to obtaining a MoistureFree Warranty.

Depending upon the estimated repair costs and total number of claims filed by Class Members, Dryvit will reimburse up to 50% of a qualifying Class Member’s Estimated Repair Costs.

Generally speaking, the MoistureFree Warranty provides full term coverage limits of \$10,000 a year up to \$30,000 for three years to pay for repairs necessary to prevent the intrusion of excessive moisture behind the cladding system. *These are the highlights of the Settlement Agreement. For complete information please refer to the Notice of Proposed Class Action Settlement available by calling 1-800-320-9415 or visiting <http://www.stuccosettlement.com>.*

What are my Rights?

- If you wish to remain in the Class, you need not do anything at this time. However, you will be bound by the rulings of the Court if the Settlement is approved.
- If you believe you are a Class Member and wish to file a claim, you must request and complete a Claim Form. Claim Forms must be signed, submitted and postmarked on or before **December 5, 2003**.
- **Class Members who want to exclude themselves (opt out) from the Class must fill out and sign the Request for Exclusion form in the Notice of Proposed Class Action Settlement and return it postmarked no later than September 3, 2002 to the address in the Notice.**
- **A Fairness Hearing will be held on October 1, 2002 to determine whether the proposed Settlement is fair, reasonable and adequate. If you remain a Class Member, you and/or your counsel may appear in opposition to the Settlement. Procedures for objecting to the Settlement are outlined in the Notice. Objections must be filed by September 3, 2002.**

For complete information including the Notice of Proposed Class Action Settlement and Claim Form, procedures to opt out or object to the Settlement write:

Dryvit Claims, PO Box 1626, Faribault, MN 55021-1626 or call:

1-800-320-9415 or visit: **www.stuccosettlement.com**



By Rick Gore
Photographs by Gouram Tsibakhashvili

This is **the face**
that's changing a thousand
minds. It could be the face
of the **first human to leave**
Africa. And it's not what
anyone expected.

This 1.75-million-year-old pioneer, found last year beneath the ruins of a medieval town called Dmanisi in the republic of Georgia, had a tiny brain—not nearly the size scientists thought our ancestors needed to migrate into a new land. And its huge canine teeth and thin brow look too ape-like for an advanced hominid, the group that includes modern humans and their ancestors. Along with other fossils and tools found at the site, this skull reopens so many questions about our ancestry that one scientist muttered: “They ought to put it back in the ground.”

Profile of a trailblazer

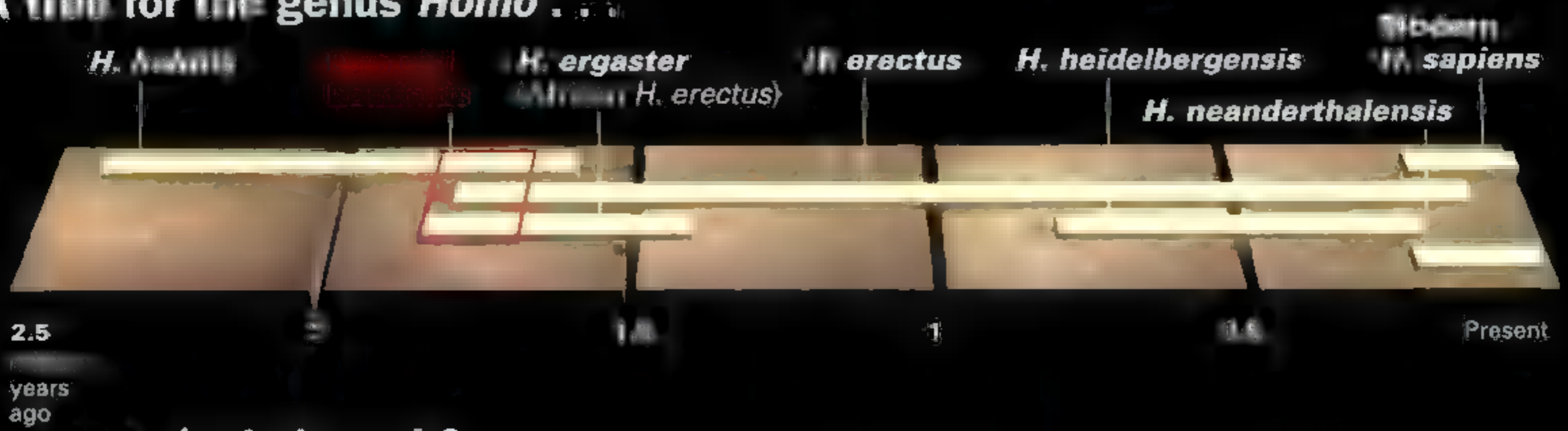
What did the earliest human found outside Africa look like? To the surprise of the scientific community, it probably didn't look much like *Homo erectus*, the big-brained hominid long thought to be the first human intercontinental migrant. The face of the newest Dmanisi skull suggests something far more primitive. As reconstructed here, it resembled chimp-like *Homo habilis*, a 2.4- to 1.6-million-year-old hominid with long arms and short legs—proportions some have thought better suited for life in the trees than

trekking from Africa. It had a thin brow, a small nose, and a brain less than half as large as a modern human's.

The Dmanisi skull probably belonged to a teenager. Like skulls of young humans today, it is relatively thin walled and slender. Was it a male or a female? The skull's small size suggests it might have been a female, but its large canine teeth seem masculine—male apes today use big canines in sexual or territorial display. Either way, this hominid likely had plenty of facial and body hair.



A tree for the genus *Homo*



Or a single branch?



ART BY MAURICIO ANTÓN AND JOHN R. ANDERSON, NGM ART



Insights on a long debate

Skulls from as many as six individuals have been discovered in the same 1.8- to 1.7-million-year-old layer of sediment at Dmanisi since 1991. They seem to represent the same species, even though they range in size from gargantuan (a well-worn mandible, below)

to relatively small (the new skull, above right). If individuals this varied were belonging to the same species, then the most common version of the *Homo* family tree (top) may have to be redrawn. Perhaps all species after *Homo habilis* (middle) be grouped together as two variable forms: *Homo erectus* and *H. sapiens*.



SKULLS AND MANDIBLES: SAME SCALE



The first explorers?

Always a crossroads, the village of Dmanisi (above) once overlooked the old Silk Road through the Caucasus region. Nearly 1.8 million years ago the site lay on a peninsula between the Black and Caspian Seas (map, right), along one of several land corridors into Eurasia. Humans could have moved out of Africa—and back into it—in multiple waves, reaching Java by at least 1.6 million

years ago. By one million years ago, Homo had spread across Eurasia, leaving bones and tools in its wake.



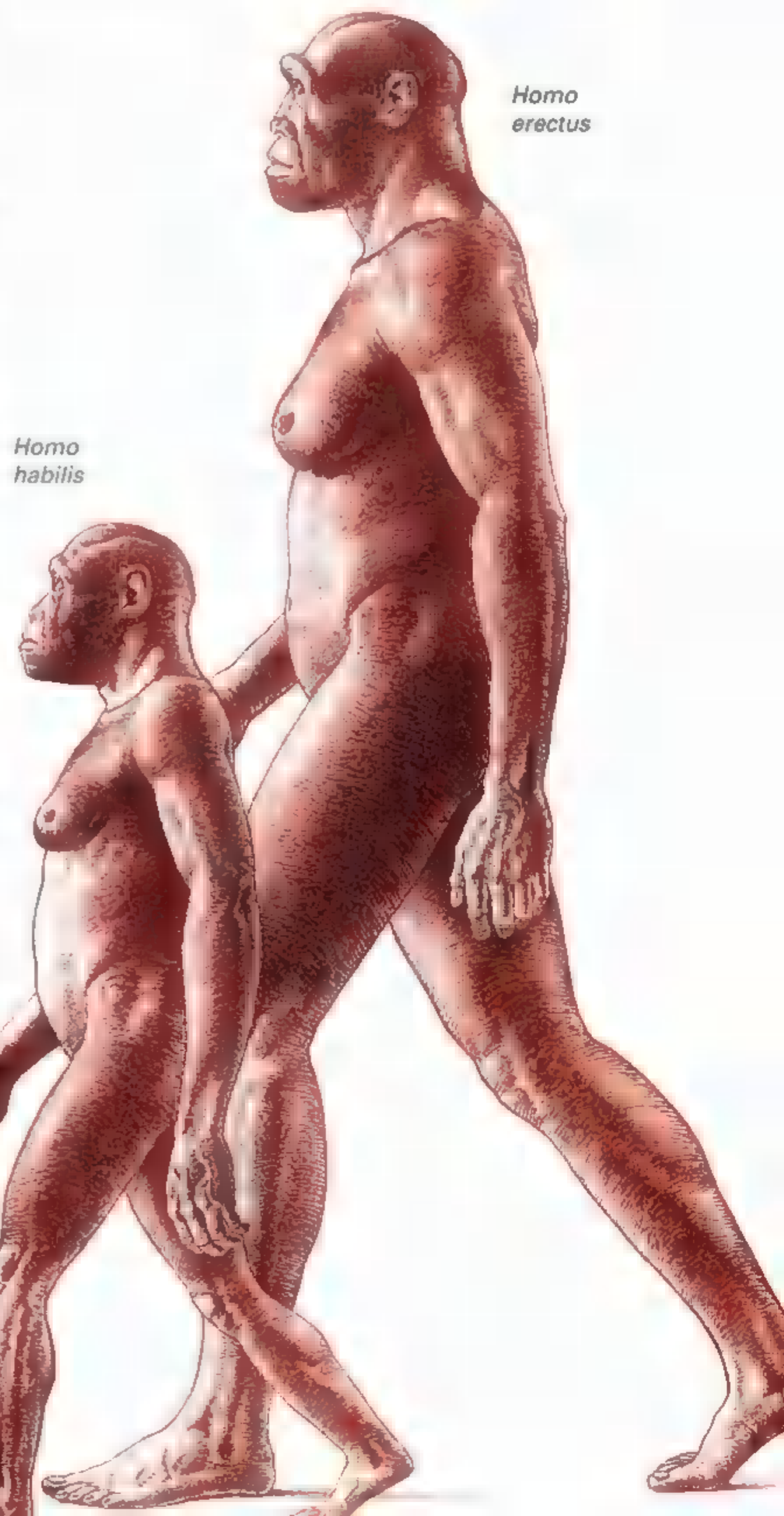
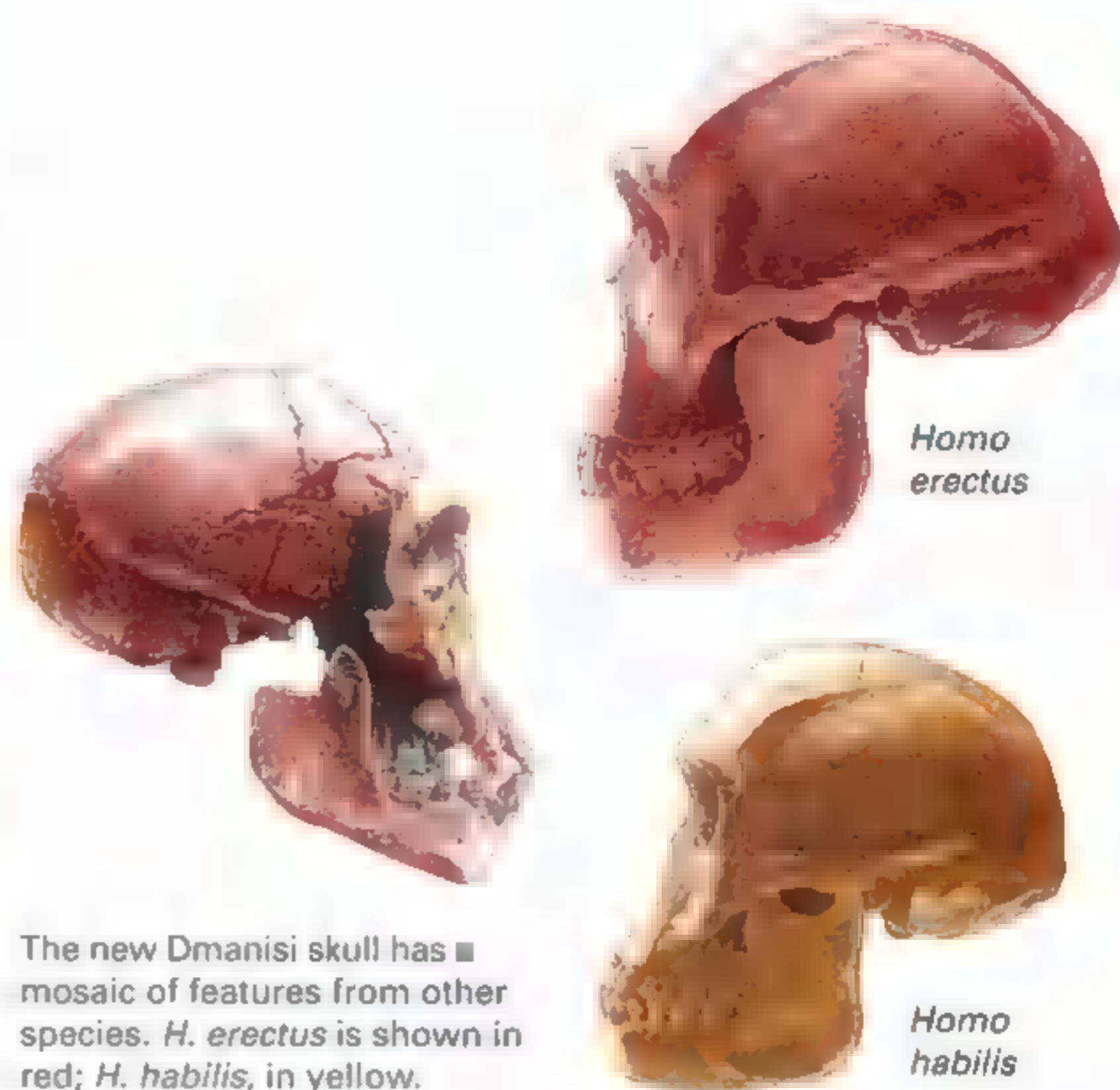
“It looks like the first people **out of Africa** came out with a **little pea brain.**”

Philip Rightmire of Binghamton University, who has spent a career measuring the bumps on the skulls and spaces between the eyes of a hodgepodge of fossils known as *Homo erectus*, is pronouncing a paradigm shift. Like most paleoanthropologists, Rightmire has long regarded *Homo erectus* as the first pioneer—the first hominid to leave Africa. But the new skull found under a medieval village in the republic of Georgia is shaking that assumption, if not the trunk of our family tree. Maybe the first human to walk out of Africa wasn't a classic *Homo erectus*, a creature with a big brain and the ability to make complex stone tools. Maybe something more primitive—a kind of missing link between *Homo erectus* and the first member of our genus, *Homo habilis*—got out earlier. Rightmire's world has been turned upside down—and he seems almost gleeful.

So is David Lordkipanidze, the Georgian scientist and National Geographic Society grantee whose team found the skull, as he pulls out casts of the skull and a matching jawbone at the Society's headquarters in Washington, D.C. Skulls of humans this old are rare. And they don't usually look this good. “This is perhaps the most complete skull of a hominid of this age,” says Lordkipanidze. Most of the fragile bones of its face are intact. The skull and the jawbone have many of their teeth, including a wicked set of canines that makes them look like props from *I Was a Teenage Werewolf*. The interior of the skull shows fine details of how the brain and optic nerve lay against the bone.

Lordkipanidze, whose friends call him Dato, is a paleoanthropologist at the Georgian State Museum in Tbilisi. In the 1990s Dato and his colleagues put Dmanisi, a hilltop dig overlooking the ancient Silk Road, on the list

The new skull suggests that leaving Africa didn't require a big brain. Now researchers are looking for the specimen's leg bones. Short legs like *Homo habilis*' would shatter another long-held assumption: that migration required a long, *Homo erectus*-style gait.



THE ORIGINATES

Humans weren't the only creatures leaving Africa 1.75 million years ago: Hundreds of animal bones have been unearthed at Dmanisi (select species shown below), and 10 percent of them are African species. The first wave of emigrants—including ostriches (leg bone, far left) and short-necked giraffes (foot bones, left)—was made up of species that

scientists consider adaptable and opportunistic. They met Eurasians such as wolves (skull, top right), deer, and saber-toothed cats, whose fangs fit holes in one of the human skulls (left). Cats were a menace, but they may have benefited humans: Simple chopping and scraping tools found here may have been used for scavenging the animals that cats killed.

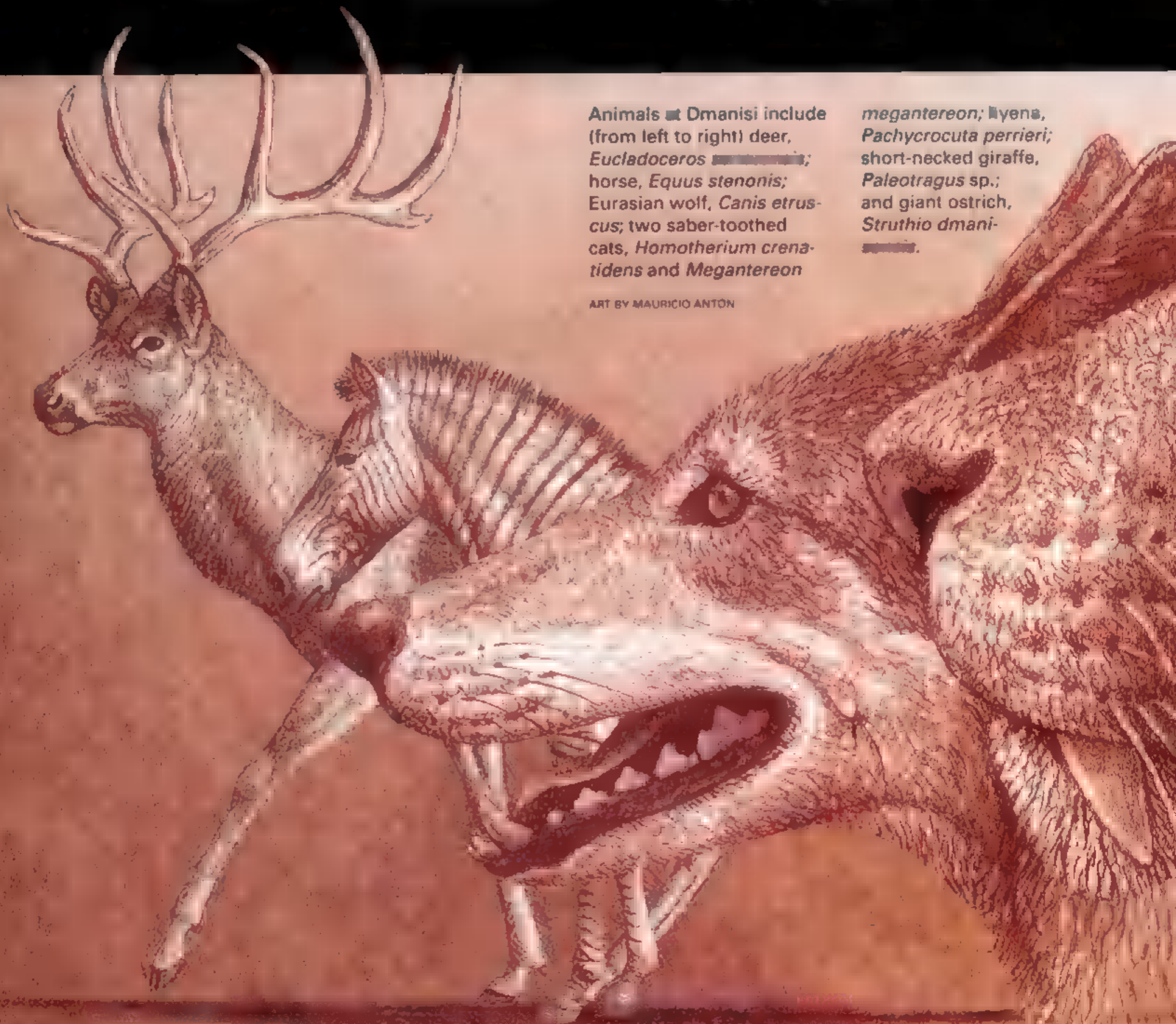


INDIVIDUAL FOSSILS SHOWN AT DIFFERENT SCALES

Animals at Dmanisi include (from left to right) deer, *Eucladoceros*; horse, *Equus stenonis*; Eurasian wolf, *Canis etruscus*; two saber-toothed cats, *Homotherium crenatidens* and *Megantereon*

megantereon; hyena, *Pachycrocuta perrieri*; short-necked giraffe, *Paleotragus* sp.; and giant ostrich, *Struthio dmanisi*.

ART BY MAURICIO ANTON



of the world's great fossil hotbeds. In that decade the team unearthed several faceless skulls and mandibles—they seemed to be *Homo erectus*—along with thousands of simple stone tools in sediments the team dated at between 1.8 and 1.7 million years ago, the earliest undisputed evidence of humans outside Africa. Those dates at first surprised a skeptical scientific community. In the early 1990s most scientists thought *Homo erectus* hadn't departed Africa until around a million years ago.

Then last season, while visiting another dig in western Georgia, Dato got a call on his cell phone from Dmanisi: Another skull was coming out of the earth. Dato rushed back. The skull he saw half-buried in the dirt astonished him.

Could it be that the **first human** intercontinental traveler wasn't a classic ***Homo erectus***?

Usually fossil skulls are crushed almost beyond recognition, but this one looked almost as complete as a skull you'd find at a 21st-century crime scene. And it didn't look like *Homo erectus*. Its browridge seemed too thin. It didn't have much of a nose, and it had those werewolf canines, holdovers from our apelike ancestors. And its brain case was tiny—less than two-thirds the size of an average *Homo erectus*. If brain size is a measure of intelligence, as scientists have long believed, then this hominid from Georgia probably wasn't nearly as smart as a typical *Homo erectus*.

SOCIETY GRANT

This Research Committee project is supported by your Society membership.

To Dato the new skull had the chimplike face of *Homo habilis*, a small hominid with long, dangling arms who made primitive stone tools 2.4 million years ago. The implications left Dato



reeling. “These hominids are more primitive than we thought,” he said. “We have a new puzzle.” Could it be that the first human intercontinental traveler wasn’t a classic *Homo erectus*?

Homo erectus in Africa was a tall creature with long strides and a big brain, built much like us. *Homo habilis*, on the other hand, had short legs and long arms. *Homo habilis* tool sites found in Africa suggest that the species lived only near reliable water sources. It didn’t seem inclined or constructed for migration.

That made Dmanisi’s primitive tools more puzzling. Scientists had long thought that the first pioneers relied on complex stone tools—hand axes and such—like those found in Africa and dated to the time of *Homo erectus*. Scientists think hand axes allowed early humans to effectively butcher and process meat, enabling migrants to take in more energy-rich

“There’s no reason to downgrade these early Georgians on the IQ scale. They took a long hike, and they made it.”

fat, grow bigger brains, and build taller bodies. But the tools found to date at Dmanisi are all simple choppers and scrapers like those that *Homo habilis* used in Africa to cut small pieces off carcasses or pound marrow from bone. Maybe scavenging provided all the nutrients a migrant needed.

And the tiny brain of the Dmanisi skull? Scientists may be forced to reexamine the connection between brain size and intelligence. “There’s no reason to downgrade these early Georgians on the IQ scale,” says Philip Rightmire. “They took a long hike, and they made it.” Maybe, says Rightmire, brain size by itself doesn’t matter, and it’s instead the ratio of gray matter to the rest of the body that determines intelligence. In other words, these small-brained humans might have done more with less.

Dato hopes soon to find bones from the rest of the skull’s body; only then will we know whether this animal was built like *Homo erectus*, *Homo habilis*, or something in between (for now Dato still cautiously calls the Dmanisi hominids *Homo erectus*). But one thing is certain: The new find at Dmanisi complicates most models for *Homo erectus* using its brave

new brain to march into Eurasia. *Homo erectus* in Java and China was heavier and more robust than it was in Africa. Moreover, Asian *erectus* did not have hand axes. So, it’s possible that *Homo erectus* evolved from this primitive Dmanisi stock somewhere in Asia and then moved back to Africa. Maybe there were multiple migrations back and forth.

Maybe, suggests Milford Wolpoff of the University of Michigan, we should scrap the idea of *Homo erectus* entirely and simply say that everything after *Homo habilis* is *Homo sapiens*. The remarkable variability of the specimens found at Dmanisi may support this radical revision of *Homo*’s genealogy.

The Dmanisi team has found parts of as many as six individuals in the same layers of rock. Among them is an enormous jawbone; it belonged to an individual who must have been

significantly bigger than the others. It’s possible that there were several species of hominids here, but Dato thinks that’s unlikely—the fossils were found close to each other and different hominid species don’t tend to be found

together. If they’re the same species, then the size differences need to be explained some other way. Perhaps the big mandible belonged to an old male, and like gorillas today Dmanisi males were much larger than females. Or perhaps our ancestors were as variable in size as humans are today. Why not? After all, Shaquille O’Neal and Danny DeVito are members of the same species. Is it possible that the scientists who have given new species names to every early *Homo* find with significant differences have made our family tree more complicated than it really is?

These questions please Dato, and being a Georgia patriot, he’s also pleased that such critical insights into humanity’s first footstep into a new world began to emerge at the same time his nation was struggling to establish its independence in the early 1990s. “It was a very hard time in our history,” he says. “Dmanisi was our first major international science project. Now *this* has happened. It’s luck, you see, really big luck.”

MORE ON OUR WEBSITE

Get a 3-D view of the new Dmanisi skull, see additional images, and find a listing of related resources and links at nationalgeographic.com/ngm/0208.



More finds, more mysteries

Dmanisi's newest skull (top), discovered by a team led by Georgian researcher David Lordkipanidze (above, in blue vest), was nearly whole and exquisitely preserved. Next mission: Find the rest of the new skull's body to go with its upper arm bone (center right). Will the body turn out to be as primitive as the latest skull and stone tools found at the site (right, at left, shown) with a more advanced tool associated with *Homo erectus*? That's one of many riddles in the story of humanity's first great exodus that may be solved at Dmanisi in the coming years. □





O C E A N S O F

S O U T H A F R I C A

B Y K E N N E D Y W A R N E P H O T O G

P L E N T Y

A S T E E M I N G S E A S

R A P H S B Y D A V I D D O U B L E T

Hounding its meal, copper sharks turn frenzied sardines into a delightful riot. Both then move in for a bite. Off South Africa's coast the Atlantic and Indian Oceans meet, and cold and warm waters swirl, a phenomenon like nowhere else on Earth. This flash of hunting sardines is just part of the wet, wild show.

CHRYSSA BRACHYURUS (SHARK); SARDINOPS (SARDINES)



WHERE GARDENS GROW

Just a glint in the water in Cape Town's Table Bay springs the Fynbos of grasses. Atlantic has a reputation of its cut and dried grasses, but the plants have not been seen since. The plants were first seen in 1800, but the plants that kept on the edge of the water, from the hollow, waving stalks.



HIBERNUS BIRNIE

Neomura at Laysan Shoal, spotted
referred to as the tiger shark, sharks
and the infant of mammals, teeth
M. 1990. 1991. rays, and invertebrates.
"Thuggie" breed here in the
1990s. 1991. females give birth in
cooler waters farther south, where
the rising continental shelf allows
the warm Gulf of California waters to



THE SKY WAS WHITE

WITH GANNETS AND FILLED WITH THEIR MANIC CHATTER. WINGS FOLDED TO THEIR SIDES, THEY PLUMMETED INTO THE SEA LIKE FEATHERED MISSILES, LEAVING GREEN BUBBLE TRAILS IN THEIR WAKES. THEY WERE HUNTING SARDINES, AND

THE WATER BOILED WITH FISH.

IT WAS AS IF THIS PATCH OF SEA OFF THE EASTERN COAST OF SOUTH AFRICA HAD BEEN TURNED INTO A POT OF BOUILLABAISSE—AND

EVERYONE WAS FALLING TO THE FEAST.

SCORES OF CIRCLING DOLPHINS HARRIED THE SARDINE SHOAL INTO AN



ever tightening mass. Panicked sardines threw themselves into the air and splashed back into the melee. A pale pink dorsal fin sliced through the midst. Then another. “Copper sharks!” said Mark Addison, our boat skipper. “Fantastic! Look—three, four, five of them.” Tails lashing, they lunged and rolled in an orgy of feeding.

Sardines are winter’s gift to South Africa’s east coast waters: an all-you-can-eat seafood buffet that attracts diners by the tens of thousands. Sharks, seals, seabirds, dolphins, and game fish converge on vast schools of *Sardinops sagax*, the South African pilchard, or sardine, which migrates northward along the coasts of the Eastern Cape and KwaZulu-Natal between May and August.

On shore the fever can be almost as great as in the shoals. People flock to the coast,

where beach seiners haul in bulging netfuls of sardines. Sometimes nets are superfluous. Forced inshore by predators, shoals simply wash up in the surf—glittering sardine waves that dump fish knee-deep on the sand.

At Illovo Beach, 20 miles south of Durban (map, page 17), I watched the “rainbow nation,” as post-apartheid South Africa likes to think of itself, united in harvest. An Indian woman, glamorous in her fine sari and gold jewelry, laughed as she hurried up the beach with handfuls of fish wriggling in her manicured fingers. A barrel-chested Afrikaner, tanned the color of mahogany, talked to netters as they sorted their catch into baskets and grumbled about the price. Ten rand a basket was the going rate—just under a dollar for 40 pounds of fish. At the water’s edge, Zulu mothers gathered fish into their voluminous skirts while their children darted forward, burrowing into the folds of each incoming net to scoop out the silver slivers and stuff them into supermarket bags, jackets, shirt pockets. No one scolded. There was plenty for all.

The communities on this coast, sniffing tourist dollars in the sardine windfall, have dubbed the event “the greatest shoal on Earth.” The public can phone a toll-free hotline to hear which beaches have the best sardine action, and the town of Scottburgh has started up a sardine festival, complete with karaoke, beach competitions, and cooking demonstrations using the traditional Afrikaner three-legged pot, or *potjie*, now jokingly referred to as the Mandela microwave.

Photographer David Doubilet, who has documented many of the planet’s aquatic extravaganzas, calls the sardine run “one of the most amazing pulses of life in the world’s oceans,” a phenomenon every bit as dramatic as the migrations of the African savanna. In fact, the whole South Africa coast—from the coral reefs of the Indian Ocean to the kelp beds of the Atlantic—is one of the richest, most biologically diverse and most oceanographically complex marine environments on Earth.

One of many vessels defeated off the Cape of Storms, as some call Africa’s weather-beaten peninsula, the *Ikan Tanda* cargo ship, her engines stalled, was driven ashore near Cape Town last year by 55-foot swells. She was later towed to ■■■ on a mighty spring tide.



THE COASTLINE OF SOUTH AFRICA, STRETCHING 1,740 MILES FROM MOZAMBIQUE TO NAMIBIA, IS PRESIDED over by two great oceanic systems: a powerful current on one side of the continent and a strong upwelling on the other. Like potentates, they control what happens in their respective realms.

The ruler of the east is the Agulhas Current, the African equivalent of the Gulf Stream, sliding southward at up to five miles an hour and shifting warm Indian Ocean water from the vicinity of Mozambique toward the southeast corner of the continent. Coral reefs are a flamboyant ecological signature of the Agulhas coast. Diving on the reefs at Sodwana Bay, near South Africa's border with Mozambique, is an experience of visual overload. There is not one surgeonfish species but 20; not one moray eel but a dozen. Corals, fishes, anemones, shrimps—everything comes in multiples. Trying to take it all in is like listening to a jazz tune with a million variations.

If luscious diversity characterizes the tropical east, then in the domain of the western potentate productivity is king. Along the Atlantic coast from the southern tip of the continent to as far north as Angola, the controlling oceanic process is the wind-driven Benguela upwelling system, which draws cool, nutrient-rich water from the seafloor to the surface. Think of it as a giant submarine pump that replenishes the fertility of inshore waters, greening them with phytoplankton and nourishing the entire food chain. The Benguela system supports the largest mainland seal colonies in the world, masses of seabirds, endemic penguins, and fisheries that provide employment for 25,000 South Africans as well as recreational angling.

Kelp, especially the giant Atlantic variety *Ecklonia maxima*, called sea bamboo, is the trademark of the western coast. Like its terrestrial namesake, sea bamboo grows at a prodigious rate—up to half an inch a day—and the fronds, eroded constantly by wave action, produce six times their own weight in detritus each year, making the kelp ecosystem one of the most productive on Earth. Finning through jungles of it, thrusting aside the stipes as thick and smooth as baseball bats, which reach 30 feet and more toward the surface, makes you feel like an underwater Livingstone or Stanley, with discoveries waiting at every turn.

Under a swaying kelp canopy on a rocky

shore near Cape Town, I found marine snails as big as grapefruit and massive limpet-like chitons whose chunky overlapping shell plates gave them the appearance of having just crawled out of the age of dinosaurs. A rock slab was completely covered with Cape urchins—orange, mauve, and tomato-colored, each with a barricade of fine spines. Baby abalones, or *perlemoen* (after the Dutch word for mother-of-pearl), hide beneath them to escape the attention of predators. I lifted up a couple of urchins, and sure enough, three or four fingernail-size *perlemoen* scooted across the rock to find another shelter.

Among the gray hottentot fish, scarlet romans, and other reef denizens gliding between the kelp stipes were shysharks, which curl into a ring when threatened, cover their eyes with their tails, and drift about like a cartilaginous quoit until the danger is past. They sleep stacked one on top of the other under ledges. I found one of their pale yellow egg cases—a “mermaid’s purse”—tied to a kelp frond; a bauble from the Benguela crown.

The two oceanic titans, flexing their muscles on either side of the continent, indulge in a bit of arm wrestling along its blunt southern flank. Satellite images of sea surface temperatures show the Agulhas Current as a yellow tongue of fire licking at the green reservoir of cool southern waters and flinging warm eddies westward into the Benguela system. It is the interaction between warm and cold, east and west, that makes the South Africa coast unique. Although there are three other major upwellings in the world—off the coasts of California, Peru, and northwest Africa—only in South Africa is the cold, productive west coast upwelling influenced by a warm, fast-flowing east coast current.

The sardine run is an indirect result of that interplay. By rights sardines shouldn't be on the eastern coast at all. They are cold-water fish, and their stronghold is the southern and western coasts, where the Benguela holds sway. There they are harvested in their billions by purse seiners and turned into fish meal or cooked, sauced, tinned, and sold under a dozen different brands (one describes the product as “brainpower food”). Together with their close relatives the anchovies and herrings, sardines make up about a quarter of the world's fish catch.

For most of the year inshore water temperatures on the east coast are warmer than 68°F and outside the sardines' comfort zone. But in winter a combination of cooling land breezes and a mild upwelling of Agulhas Current waters onto the continental shelf creates a narrow, cool-water corridor that sardines can exploit.

It is as if the eastern potentate had turned his back for a moment. The sardines, seizing their opportunity, move northward, find the corridor, and stream up the coast like lemmings. Once they reach Durban, those that haven't been caught, eaten, or beached spread out onto the continental shelf to feed and

TRYING TO TAKE IT
ALL IN IS LIKE
LISTENING TO A **JAZZ**
TUNE WITH A
MILLION VARIATIONS.

spawn. As the surface waters are warmed by the growing heat of the spring sun, the sardines descend to cooler depths, but eventually rising temperatures drive them back south to rejoin the parent population off the Eastern Cape.

Not many of South Africa's sardines choose the travel option—perhaps 30,000 tons of fish in all—but enough do for the KwaZulu-Natal sardine run to be considered one of the marine wonders of the world.

DOUBILET AND I TIMED OUR ARRIVAL TO COINCIDE WITH THE FRONT-RUNNERS OF THE SARDINE MIGRATION: pilot shoals of perhaps half a million fish that start to appear about the first week of June. The main shoals come some weeks later. These mother ships of the sardine fleet can cover several square miles and contain hundreds of millions of fish.

Rather than wait for the shoals to reach us in Durban, we decided to head south with Mark Addison, a multitalented marine guide who specializes in the sardine run, to meet the fish on their way north. We based ourselves at Mkambati Nature Reserve, just south of the

KwaZulu-Natal border with the Eastern Cape.

Mkambati is one of the few places along this cliffbound stretch of coast where a boat can be launched—and then only if the sea permits. Not without reason is this called the Wild Coast. Tankers break their backs out here when storm waves from the Southern Ocean, forced upward into steep peaks by the south-streaming Agulhas Current, superimpose to form ship-swallowing swells 60 feet high. We never tackled seas greater than a tenth that size, but the daily rodeo ride out through the breakers in Addison's 22-foot inflatable—and later, the hair-raising return trip, hurtling right up onto the beach on the crest of a curling wave—left us in no doubt about the power of the Indian Ocean.

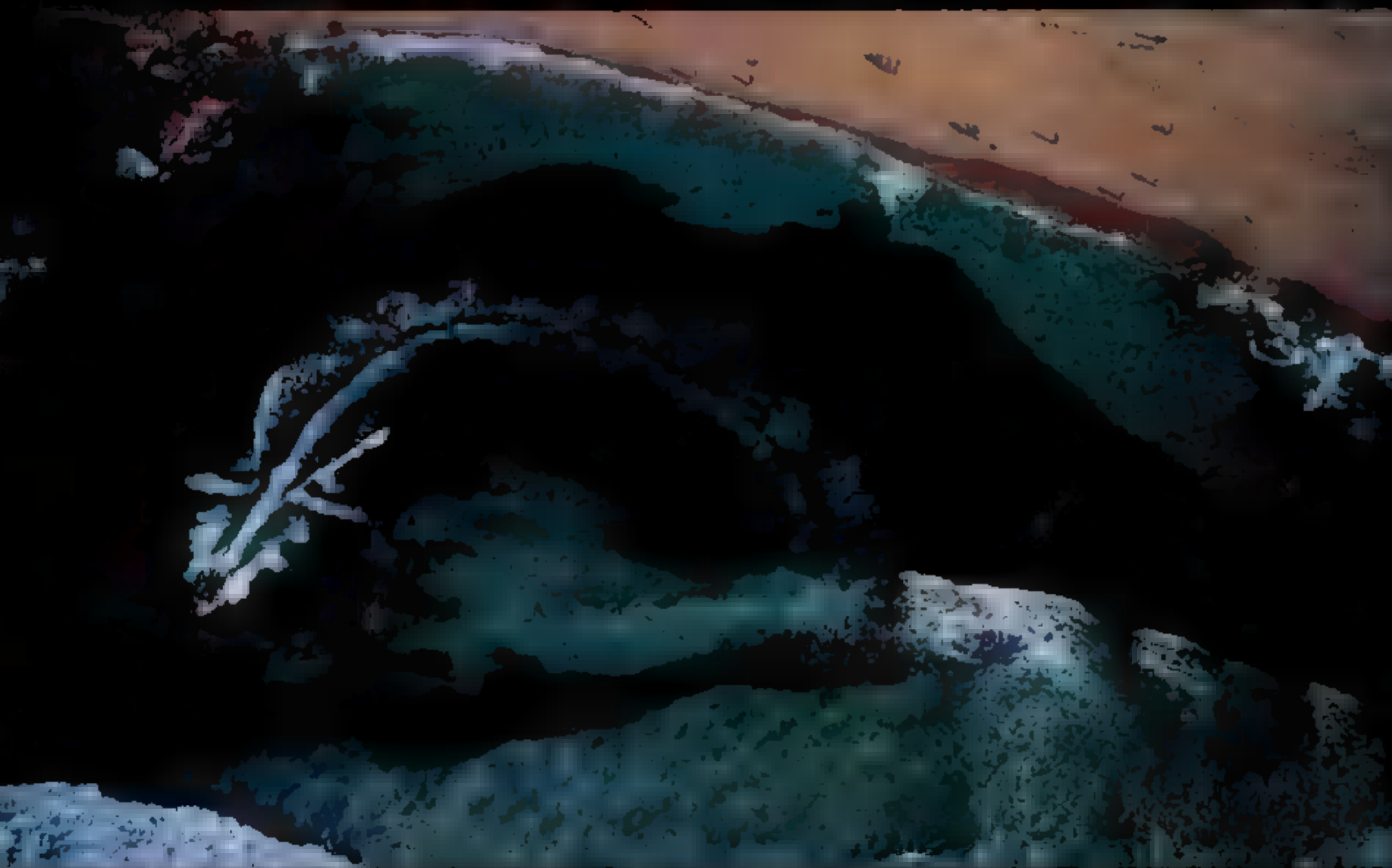
In our search for shoals, it was the gannets we saw first in the distance, looking like swirling flecks of ash. Addison—cap jammed down on his shaven head—would open the throttle and race for the spot. If lucky, we would arrive to find the glorious chaos of a fully developed bait ball. These aggregations of ultimate frenzy are created when common dolphins ("common" both in name and number) work together to shear off a section of a shoal, corral it into a scrum the size of a tennis court, and force it to the surface. Only then do other predators appear, making the whole thing, as Addison says, "go ballistic."

The result is an eruption of fin and flesh. Dolphins squeal like sirens as they make strafing runs at the edges. Eight-foot copper sharks thresh their way through the shoal, biting and gulping. Cape fur seals, elastic underwater acrobats, corkscrew up through the middle then flip backward, snapping up fish on the way over. And all the while gannets rain from the sky, so fast and so many that it looks as if they are being sucked into the ocean by a vacuum cleaner.

During our weeks at Mkambati we dived on dozens of shoals, and every one was different. Some shimmered like blue carpets that suddenly turned silver as the fish caught the sun on their sides. Some were so solid and dense right down to the seafloor that swimming underneath them was like crawling under a mattress—and just as dark. Others were on the move, specks of light streaming ceaselessly toward us as mesmerizing as a computer screen saver. Sinking down (Continued on page 16)



SOME **SHIMMERED** LIKE BLUE CARPETS THAT



Winter's radiant masses, sardines shoot north along the east coast following a transient corridor of cold-water currents. From above (left), the sardine shoals, cut by surfboats with nets in tow, resemble oil slicks. On shore, fishermen and their inshore use beach-seine nets to haul in the protein-rich fish—hundreds of tons a year—to sell at local markets.



SARDINES SAGA

TURNED SILVER AS THE FISH CAUGHT THE SUN.





UNEARTHLY UTTERINGS

Flying in for a meal, common dolphins work together to drive sardines toward the surface before gobbling them up. "The dolphins shriek as they slash through the bait, like people screaming on a roller coaster," says photographer David Doubilet. "I've never heard anything quite like it."

DELPHINUS DELPHIS



(Continued from page 11) into one shoal, I found myself in the hole of a sardine doughnut, being watched by innumerable unblinking yellow-rimmed eyes.

We found schools with just a few seals in attendance, not feeding so much as playing with the shoal—treating it as a living beach ball. Watching sardines part and re-form around a seal is like watching some super-organism reshaping itself with effortless mathematical precision. Occasionally our inflatable brought us upon the scene of a bait ball that had dissipated—or been consumed—nothing remaining but a few scales and a lingering smell of sardine oil.

The presence of sardines must be a powerful drawcard for predators, for they come a long way to dine at the potluck. The nearest seal and gannet colonies are at Port Elizabeth, 300 miles south of Mkambati. Both species rest on the sea surface between feeding binges—gannets in large flocks, seals in rafts of a dozen or so, lying on their sides with a flipper raised in the air for cooling. On calm days we spotted dozens of seal rafts, each animal giving its one-flipper salute as we passed.

Dolphins—bottlenose and common—are residents of this coast, but they are never here in such large numbers as they are during the sardine season. On one occasion Addison took Doubilet and me ten miles offshore to dive with a thousand-strong herd of common dolphins traveling northward against the current. Addison dropped us in the water a mile ahead of the herd and retreated. We were in the heart of Agulhas country: over one shoulder the land a distant smudge, over the other a tanker crawling along the horizon toward the Cape, ahead a phalanx of dolphins advancing.

What is the sound of a thousand dolphins? It is like river rapids, or a sudden cloudburst. Close to the herd you can make out the individual *pffffts* of blowholes opening, stale air being expelled and fresh breaths sucked in. And, faintly through the puffs and splashes, the high-pitched squeaks and whistles of dolphin communication. Underwater, where those unearthly sounds are heard at full volume, it's like being serenaded by a chorus of dentist's drills.

The dolphins came on in a rush, waveful of them leaping out of the face of the ocean swells as if jet-propelled, the sunlight gleaming off their cornmeal-colored flanks. Streamlined

and athletic, Olympians of their kind, they had a focused intensity about them. "Places to be, things to do," they seemed to be saying as they sped past.

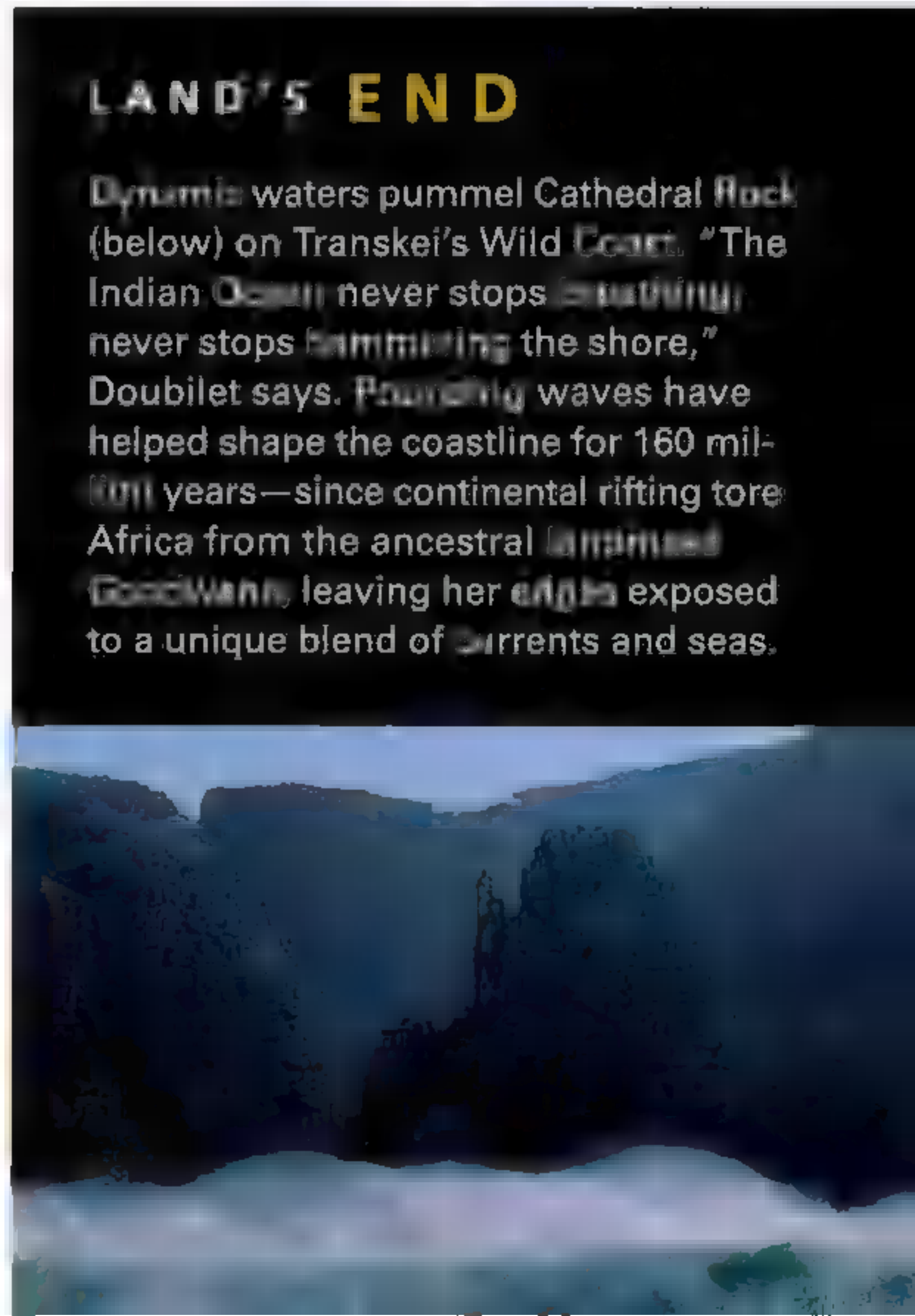
Sharks, those legendary "swimming noses," were never far from the sardine supply. They had a knack for materializing out of seemingly empty ocean. You would think you were alone—and then there would be a shark only a few feet away.

The main species associated with the sardine run is the copper shark (also known as the bronze whaler), but spotted ragged-tooth sharks also take the occasional sardine meal. Like other migrants along this coast, ragged-tooths—known elsewhere in the world as gray nurse or sand tiger sharks—move north during sardine season from the cool southern waters to the tropics to breed.

AFTER LEAVING MKAMBATI, I FOLLOWED THE "RAGGIES" TO ALI WAL SHOAL, THIRTY MILES SOUTH OF Durban and three miles offshore. Due to the Agulhas Current's southward shift of tropical water, Aliwal has some of the southernmost hard coral communities in the world. It is also thought to be a ragged-tooth mating area. During the day the sharks can be found resting,

LAND'S END

Dynamic waters pummel Cathedral Rock (below) on Transkei's Wild Coast. "The Indian Ocean never stops crashing, never stops hammering the shore," Doubilet says. Pounding waves have helped shape the coastline for 160 million years—since continental rifting tore Africa from the ancestral landmass Gondwana, leaving her edges exposed to a unique blend of currents and seas.



almost immobile, in the reef's many caverns and amphitheatres. In one, called the Cathedral, I found several floating like gray ghosts. With the merest twitch of their tail fins they adjusted their position, slowly rising and falling as if in a trance, while around the craggy walls shoals of sea goldies, a vivid orange tropical fish, swirled like autumn leaves. It is a strange thing to see a motionless shark. Many sharks, lacking the bellows-action gill covers of bony fishes, must keep moving to oxygenate their gills. Ragged-tooth sharks are an exception. They also possess the ability—unique among sharks—of gulping air from the surface to achieve neutral buoyancy.

The sheen of their olive skin, dappled with dark brown blotches, the humped back and beveled snout, the small, pale eyes with a black dot at the center—a resting raggie gives you plenty of time to linger over these details, and to focus on the feature that gives the shark its name: its orthodontist's nightmare of a mouth. Most sharks keep their hardware concealed behind their fixed crescent frowns. Raggies look as if they're holding a mouthful of nails.

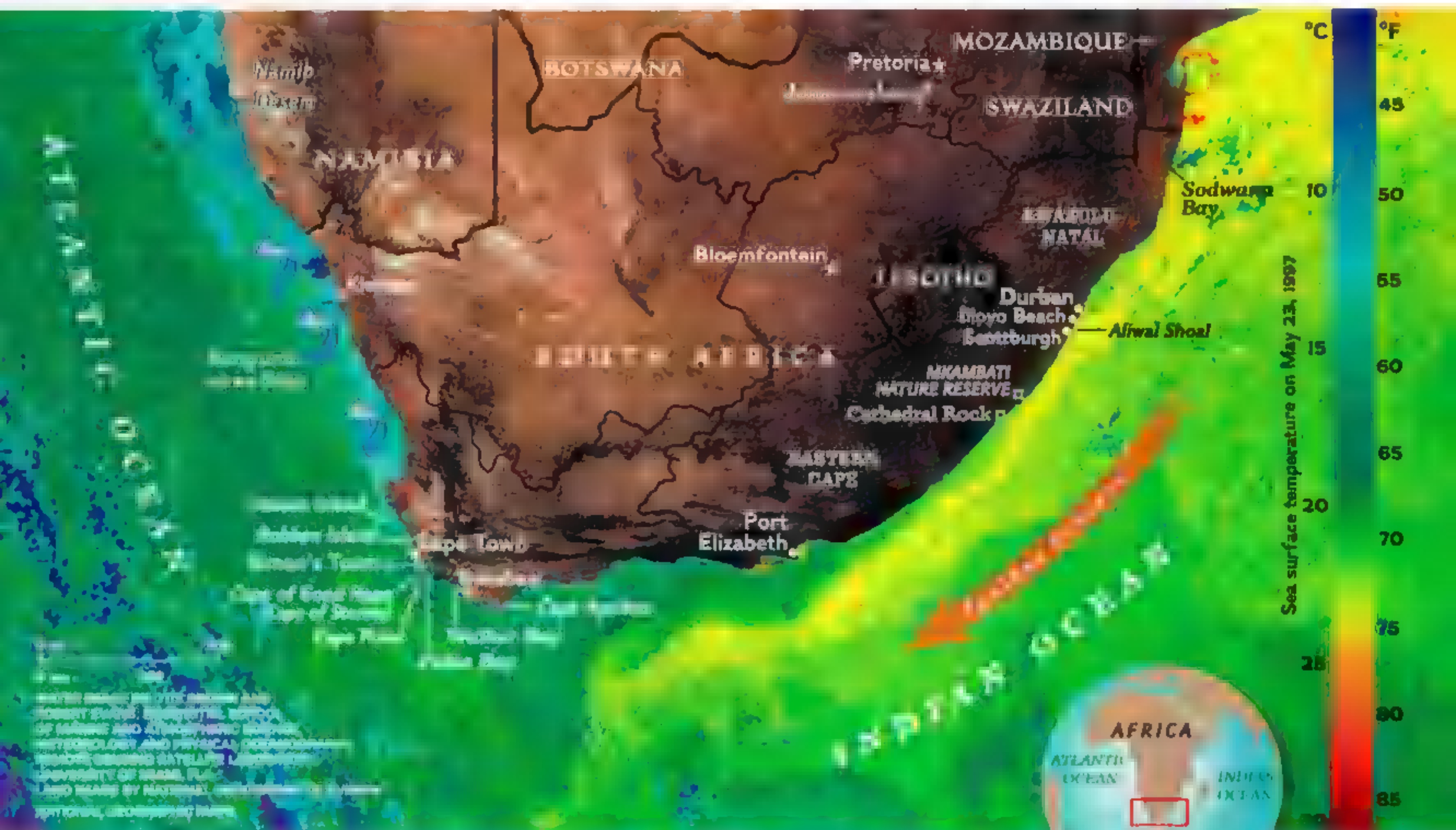
Unlike the great white shark's triangular cutting teeth, sharp as a set of chef's knives, the front teeth of a ragged-tooth shark are slender and pointed, for grabbing, while the back teeth

have rasplike surfaces for gripping and crushing. At the front of the jaw each tooth has as many as four replacements, opening out like blades of a pocketknife. Baby ragged-tooth sharks put their teeth to swift and deadly use: In one of the few instances of intrauterine cannibalism known to science, the dominant embryo within each of the raggie female's two uteri eats its siblings before it hatches as a three-foot-long superpup.

I returned to Aliwal at dusk with Mark Addison to see raggie teeth in action. Raggies become more active in the evening, and Addison has found that they will readily accept a free handout from him. By observing the sharks at close quarters, he hopes to better understand their feeding behavior—though some divers worry that this sort of activity may cause sharks to associate humans with food, a potentially fatal combination.

"Now remember, big guy," Addison warned, "their jaws lock when they bite. If you get bitten, push the snout up, and the shark will let go." Sure it will, I thought, picturing myself swimming around with a 500-pound shark clamped to my arm.

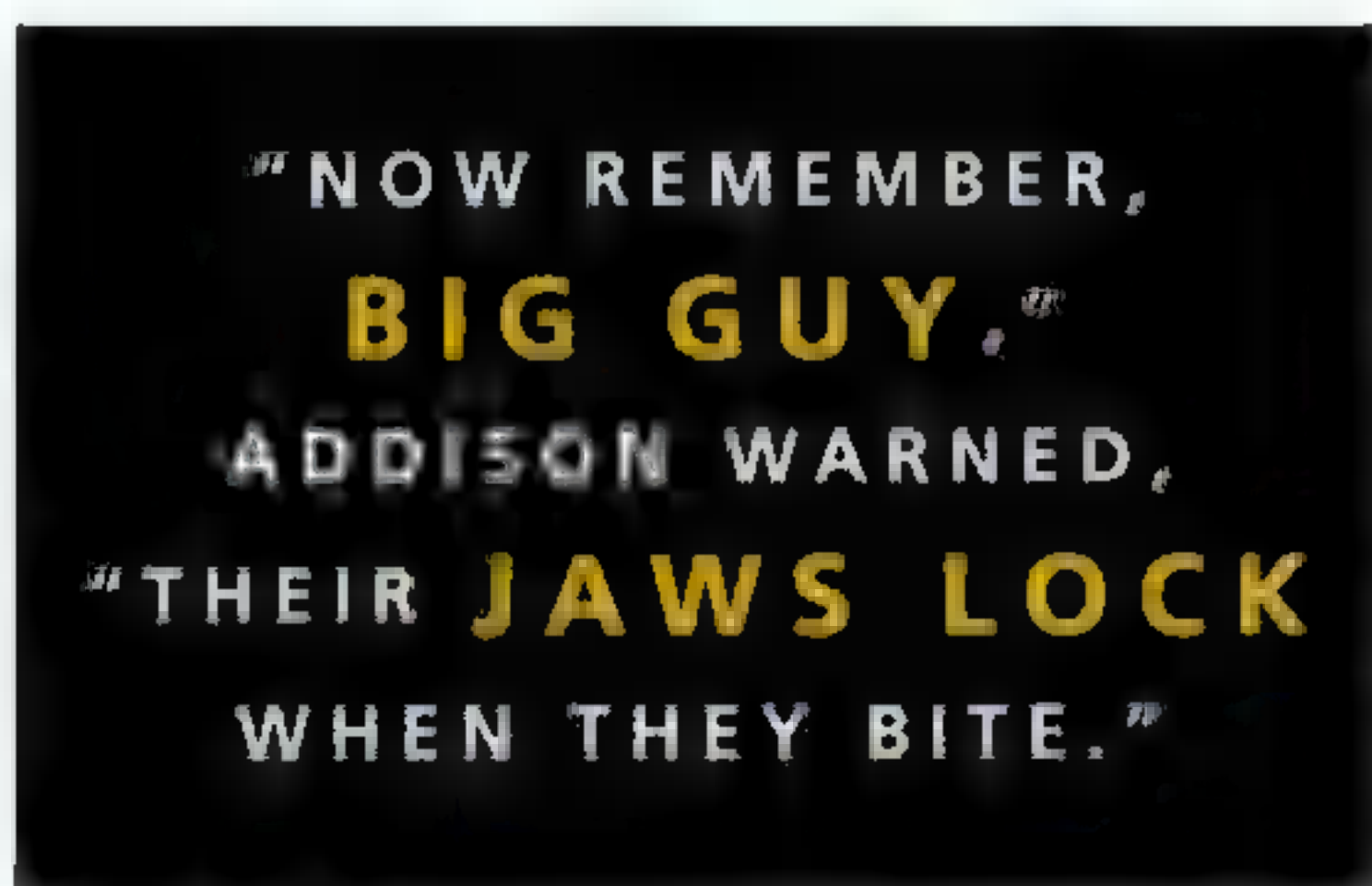
We dropped beneath choppy seas and a strong current to a sandy area that was about to become "Raggies Restaurant." Addison stuffed



two plastic drums of bonito into a crevice in the reef, then took out several fish and placed them under rocks. Soon there were a dozen sharks circling round. Often they would swim right past a fish and apparently not notice it. Sometimes they would detect the prey but seize the rock instead. Such mistakes usually cost them a tooth or two, left behind on the sand like chips of white china.

Addison started hand-feeding the sharks and passed me a bonito so I could do the same. Two or three sharks swam by, not seeming to notice my offering, so I thrust the fish more pointedly under the nose of the next in line, and the shark mouthed it delicately. I could feel the teeth puncture and compress the fish as it was pulled away from my hand. Then the jaws opened, and the fish was gone.

It all seemed very genteel. But ragged-tooth



sharks are by no means so mild mannered in all situations. The International Shark Attack File ranks the species fourth in "unprovoked attacks" on humans, behind the Zambezi, tiger, and great white. Addison believes ragged-tooth behavior is linked to water temperature. "In the Cape, which is 15 to 20 degrees colder than Aliwal, raggies are much more aggressive," he says. "The spear fishermen there talk of them with total respect and are very wary, whereas here we can spear fish in the midst of a bunch of raggies and not be hassled by them. But if the water temperature drops a few degrees, the gentle giant awakes. Their normally docile nature changes, and they become fish stealers."

I T WAS TO THE COLDER, SHARKIER WATERS OF WALKER BAY, 60 MILES SOUTHEAST OF CAPE TOWN, THAT DOUBILET WAS headed to lock lenses with an old quarry, the great white. I went farther west, to the heart of the Benguela kingdom, to see the kelp beds

and penguin colonies of Cape Town. Some Capetonians believe that the Atlantic and Indian Oceans collide right off the end of their famous peninsula. Indeed, I read in a Cape Town newspaper that a local diver reckoned he had pinpointed the exact spot. It's wishful thinking, and yet standing on the precipice at the tip of the Cape of Good Hope, it is tantalizing to imagine that out there somewhere two oceans are locked in combat.

It took several days before I could get out on the water. The Benguela coast is as renowned for its meteorological violence as for its nutritional productivity, and the Cape Peninsula, jutting into the Atlantic like a claw, catches the worst of the weather. Sir Francis Drake is said to have called the Cape of Good Hope "the fairest Cape . . . in the whole circumference of the earth," but other sailors knew it as Cabo Tormentoso, the Cape of Storms, destroyer of ships.

A dense sea fog was on the water the morning Eric Simpson—my dive partner—and I finally made our dash for the Cape. We headed for a reef called Bellows. Its name, and that of its neighbor, Anvil, give fair warning that a boat can be hammered out here in this smithy of the seas.

The swell was viscous and the color of lead as we passed Buffels Bay and neared Cape Point. Suddenly, on our port side, fishing boats appeared out of the mist. "Snoek," said Simpson, and his eyes lit up. When not working as a cameraman and diver, he fishes commercially for snoek, the local name for a large mackerel. Simpson called out a greeting to a couple of the skippers. Most of the boats were fiberglass runabouts—ski boats, they're called here. Each had half a dozen crew working two lines apiece and pulling in flapping, four-foot snoek one after the other. They would be taking home a big haul today, 40 or 50 a man. "You can't know how this is hurting my fisherman's heart," Simpson said enviously as we motored away.

The lighthouse on Cape Point was starting to show through the murk as we anchored. We dropped over the side and finned down the anchor warp, bottoming out at 100 feet. There, spilling like gold from a treasure chest, was the densest concentration of lobsters I'd ever seen. Every crevice bristled with them. Those that had no cleft to call their own were out in the open, skittering about on tiptoe or shooting away with a sudden snap of their tails. One

adventurous crustacean had climbed up a sea fan and was clinging to it like a mountaineer pondering his next move. I plunged into a thicket of the creatures just for the marvel of seeing the pell-mell scurry and scatter of a thousand lobster limbs.

Evidence of Benguelan abundance was all around. The walls of the reef were packed with encrusting life as tightly as supermarket shelves. Red bait—sea squirts the size of a rugby ball with sides as tough as old leather—were jammed together with anemones and feather stars. Tree-shaped growths of a cold-water species called noble coral, with bubble gum pink branches and white tips, looked like something that should be shrink-wrapped and sold as confectionery.

As I swam along a wall, engrossed with finger sponges and candelabra fans and daisy anemones in all their paint box glory, Simpson tapped me on the arm, and I looked up to see a copper shark cruising by. With the softly diffused sunlight shining on the splendid arch of its back, it seemed a princely ambassador for the opulent Benguela realm.

A MORE ENDEARING REPRESENTATIVE IS THE STOCKY, PINK-EYEBROWED AFRICAN PENGUIN. COOL, RICH waters make it possible for penguins—birds we normally associate with icebergs—to enjoy a breeding range that includes islands off the coast of the Namib Desert.

One morning when the “Cape doctor”—Cape Town’s invigorating southeasterly wind—had yet to begin his rounds, I slid a kayak into the harbor at Simon’s Town to go penguin-watching. I paddled out into False Bay—past the stone walls of the old British naval dock, where fur seals rolled and splashed; past a submarine returning from an exercise; past an offshore nubbin of rock packed with roosting cormorants.

A mile or so up the coast, at a beach called Boulders, I parked a hundred yards offshore among the floating mop tops of sea bamboo and watched penguins from one of South Africa’s few mainland breeding colonies commute to their feeding grounds. Groups of 20 or 30 would swim tentatively toward an opening in the kelp, bobbing

(Continued on page 24)

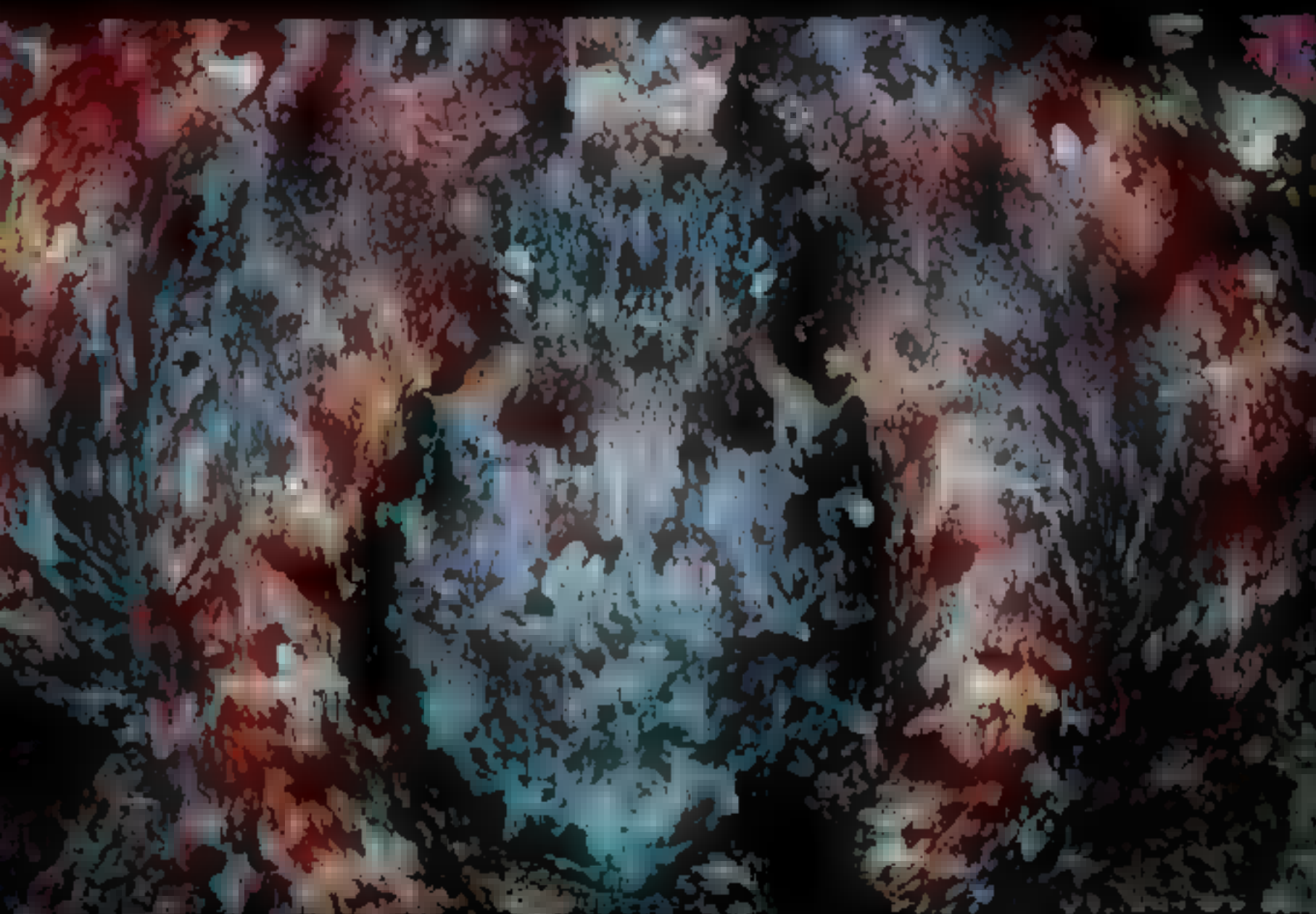
On leave from Antarctic feeding grounds, a southern right whale surfaces near Gansbaai. Protected internationally since 1935, increasing numbers now calve in sheltered bays along the southwest coast.

JENNIFER HAYES EURALAEIA AUSTRALIS





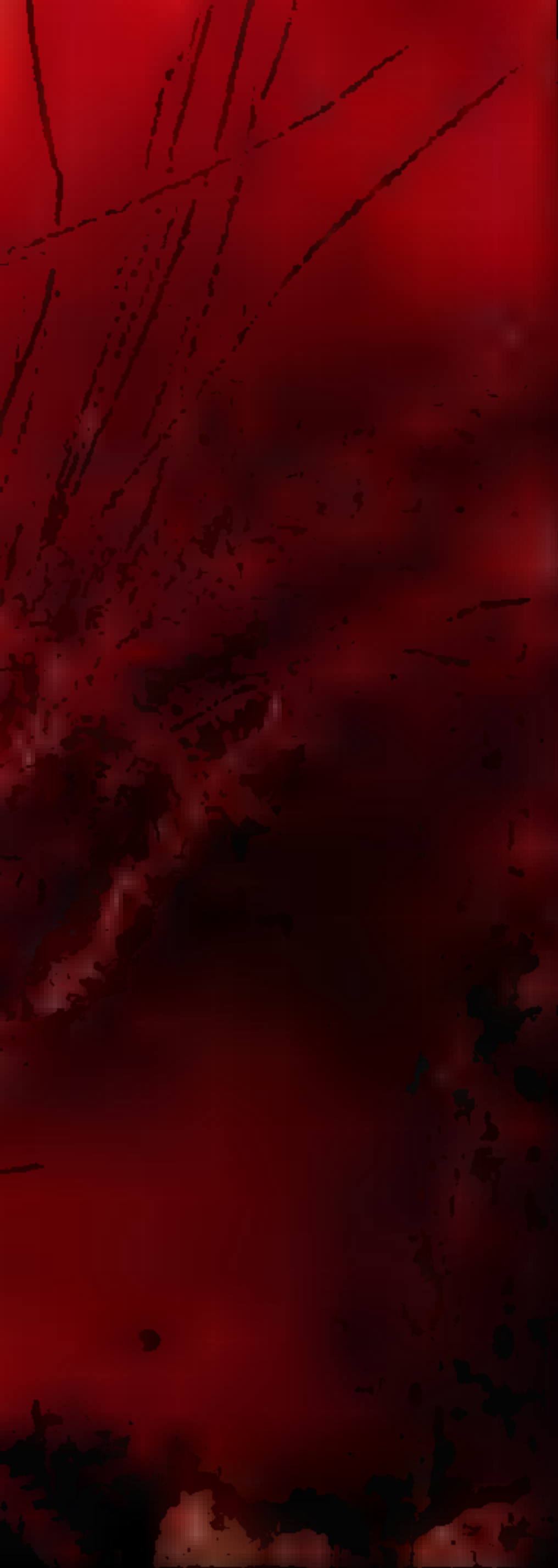
THE WALLS OF THE REEFS WERE PACKED WITH LIFE



JASUS LALANDII (ROCK LOBSTER);
VULGARIS; HAPLOBLEPHARUS EDWARDSII (SHYSHARK)

Marine life abounds around Cape Point, where the chilly Benguela current delivers its nutrient wealth to coastal waters. The hustle and bustle in False Bay peaks on the shallow seafloor, where the dwarf shishy, and shishy take refuge among more

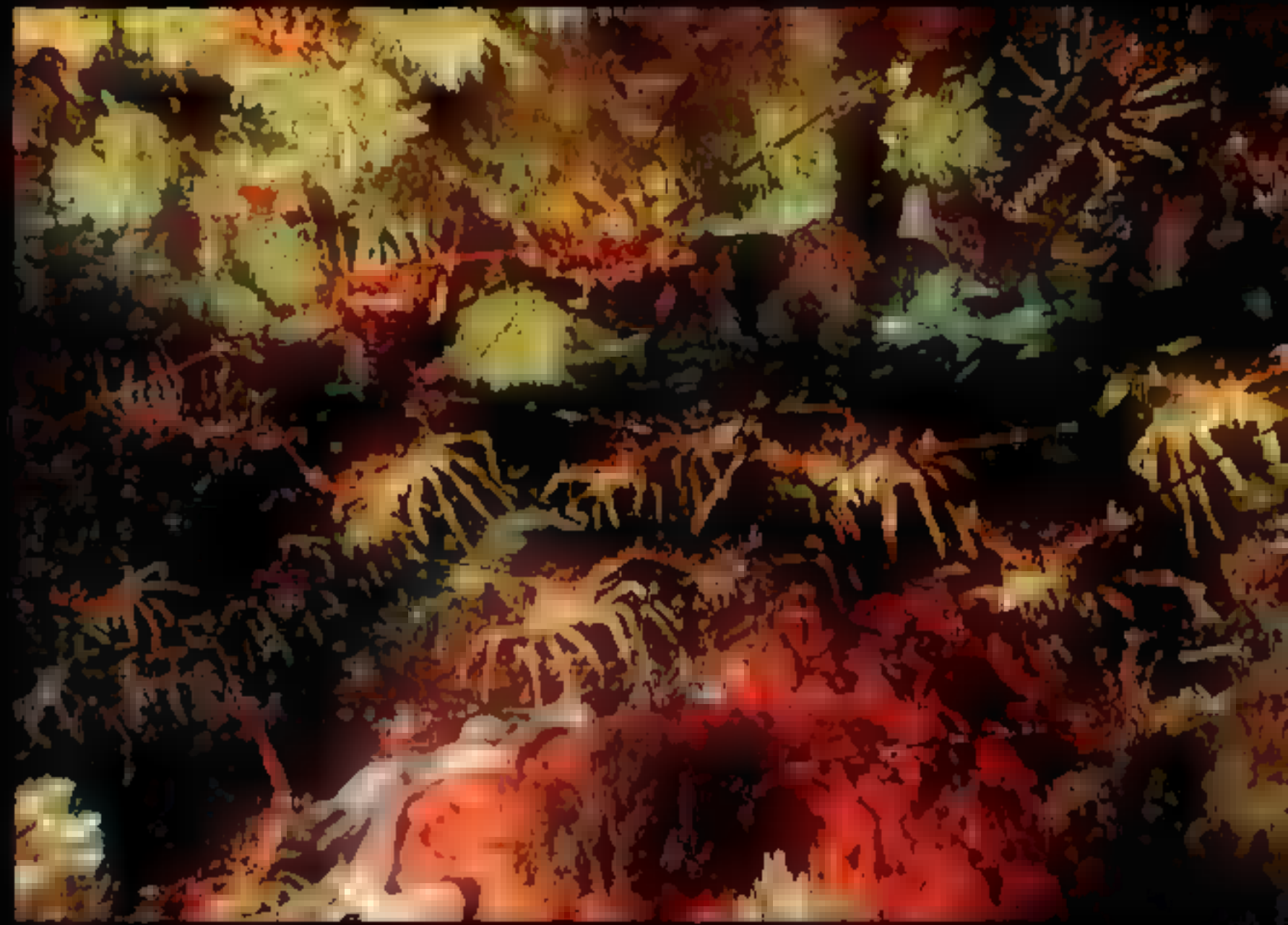
abundant. A grotto houses rock lobsters skittering among hydroids (above, top) and scavenges into the feathery branches of a hydroid colony nearby (above). "Their legs fly as they work," says Doubilet. "You can hear them squeak and yip as they work."



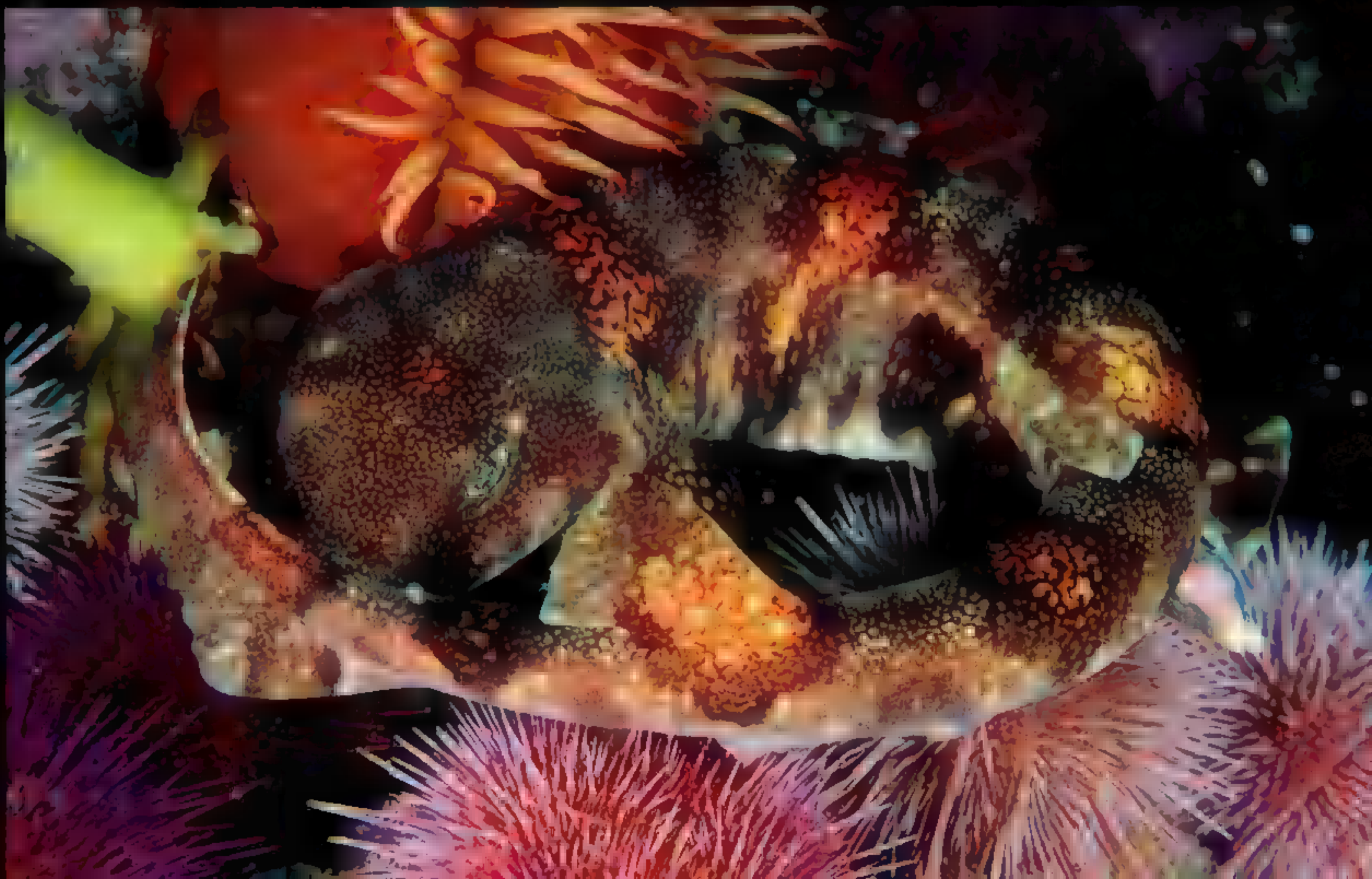
About 2,000 tons of these west coast crustaceans are taken by fishermen each year, mainly for export.

Timid both by name and by nature, the house-cat-size puffadder shyshark (bottom), curls into a defensive ball and, like its mudsl fin like

a hand across its face. Resting by day on the reef, often in a shyshark pit, it will grow after dark for invertebrates and small fish. Also reluctant to be seen, the common octopus (opposite, bottom) is a mimic and seems to turn to stone or sand when it wants to disappear.



AS TIGHTLY AS **SUPERMARKET** SHELVES.





WE SPOTTED DOZENS OF SEAL RAFTS, EACH





ANIMAL GIVING ITS ONE-FLIPPER **SALUTE**.

Thousands of Cape fur seals—the largest mainland colony in the world, with some 450,000 at its peak—mow and pup on the west coast's Klamath beach near Namibia. Great white sharks (right) are their most menacing foe at sea, but the sharks rarely pursue prey into kelp forests. At Gansbaai, a young seal thrashes in relative safety, sheltered by the swaying fronds (left).





(Continued from page 19) and shaking their heads and looking around like nervous meerkats, then make a mad dash through the channel. Their anxiety is not surprising, for seals and sharks feed along these shores, and both have an appetite for penguin.

As the penguins sped away, one dived right under my kayak, flippers outstretched, a black dart against the white sand. How perfectly it fitted its Latin name: little plunging wedge. I wished it well as it ran the predator gauntlet, for Africa's only endemic penguin has not had a happy history. Since the 1600s African penguins (also called jackass penguins on account of the donkeylike braying of the male) have been harvested for food, rendered for fat, burned as fuel in ships' boilers, and used as bait for lobster pots.

And that's only the adults. In just three decades, between 1900 and 1930, 13 million eggs were collected, most from Dassen Island 40 miles northwest of Cape Town, one of the main breeding colonies. Even the penguins'

guano was exploited—scraped up and sold for fertilizer. That process destroyed much of the breeding habitat because the birds build their burrows in the soft deposits.

Although the harvesting and scraping has ceased, the penguins remain vulnerable. In the winter of 2000, spilled fuel oil from the bulk carrier *Treasure* threatened 70,000 penguins on Dassen and Robben Islands—40 percent of the total penguin population. Realizing they would be unable to clean such a large number of oiled birds, wildlife authorities decided to buy time by trucking 19,000 unharmed penguins to Port Elizabeth and making them swim back. Three of the evacuees were fitted with satellite transmitters so their progress around the Cape coast could be tracked. Percy, Peter, and Pamela completed the journey in a little over three weeks, arriving just as the last oil from the tanker was being removed and their island homes declared fit for habitation again.

When I visited Dassen Island, now a nature reserve, the penguins were undergoing their



SPHENISCUS DEMERSUS

Messy and loud to locals but magnets for tourists, endemic African penguins have nabbed prime property at False Bay's Boulders Beach. Elsewhere they've been outcompeted by fishermen for food and by seals for space. Here, for now, they hold their own, mascots of these prolific seas.

annual molt, during which the entire plumage is replaced over a 21-day period. Because the birds cannot go to sea during this time, they are forced to rely on fat reserves built up during five weeks of binge feeding beforehand. Despite that, they lose nearly half their weight while waiting for their new tuxedos and must go out to sea for a solid six weeks of feeding to recover once the plumage comes in. Standing about in groups of a few dozen, the birds looked stoic as they endured their three weeks of bad-feather days. As I watched them, I thought of the centuries of guano scraping, egg collecting, and penguin harvesting that have gone on up and down this coast—to say nothing of seal clubbing and whale harpooning. With great abundance comes great exploitation, and South Africa has known both.

My two-ocean traverse of South Africa's coast—from the coral fiestas of Sodwana Bay to the kelp cathedrals of the Cape—left me with a deep respect for the rulers of these seas: the Agulhas Current, which shifts 75 million tons of warm water a second along one coast, and the Benguela system, whose cool, upsurging waters nourish a food chain from plankton to people along the other. It seems only fitting that just as terrestrial Africa—with its lions and elephants, rhinos and zebras—has come to hold an iconic allure, this underwater Africa should come to be seen in a similar vein: the Serengeti of the sea. □

MORE FROM OUR WEBSITE

Listen to David Doubilet talk about shooting this story. See a gallery of more images and decorate your desktop with one at nationalgeographic.com/ngm/0208.



JAPAN'S SACRED SUMMIT

Surrounded by the amazing and the mundane—temp malls, video arcades, even a non-descript *Gulliver's Travels* theme park, complete with giant Gulliver—Mount Fuji manages to rise above it all. What is it about this mountain that so mesmerizes the Japanese?

FUJI



|EXCEPT WHEN IT'S HOT|



ON FIRE

Near the churning Inari of Mount Fuji, revelers march with a flaming



shrine to venerate the volcano during Fujiwara's annual Omuro Festival.



THE SIX

More than four million people live in the shadow of Mount Fuji.



BY TRACY DAHLBY

PHOTOGRAPHS BY KAREN KASMAUSKI

It was 25 years since I climbed Mount Fuji the first time, and my 51-year-old knees reminded me, painfully, of the old saying: Only a fool climbs Fuji twice. But there I was, at 2:30 in the morning, clinging to the rocky slopes with my old friend, Gerry Curtis. Only the lights strung around the ubiquitous climbing huts were visible, running in a crazy line to the top, as we hunkered down in a cold, pritty wind.

Gerry, an esteemed professor of Japanese politics at Columbia University and a street-wise New Yorker, was making his first ascent. And now, exhausted, walking stick in hand, he looked dangerously cranky.

"We're lucky," I said, trying to avert a mutiny.

"Yeah, how's that?" muttered Gerry, as Japanese climbers stepped around us shouting brisk words of encouragement.

"For one thing," I said, "we don't have altitude headaches—the clanging pain that comes when reduced oxygen forces a climber's brain to expand against the immovable skull. Turn out, as we get older, our brains shrink—so fewer headaches."

"Is that so?" said Gerry. He took a hit from an oxygen canister and stared at me. "My brain must have really shrunk to let you talk me into this."

I couldn't blame him. Climbing Fuji isn't the snap many people think. Yet every year, during the July-August climbing season, some 400,000 mostly enthusiastic tenderfoots (20,000 on a good day) scramble for the summit of Japan's mighty beacon. For the Japanese, Fuji (early Chinese characters for which mean "without equal") is unrivaled in its capacity to stir a sense of national identity even in a society that is more individualistic than in the past.

"People my age can't even name Japan's second highest peak," said Atsushi Yamada, a sturdy 22-year-old climbing instructor with a bushy head of dyed orange hair. (It's Kita-dake in the Japan Alps.) "But *everybody* wants to climb to the top of Fuji." And at 12,388 feet you need neither rope nor crampon to get there. Just energy, particularly if you do it a popular way—a lemminglike dash to glimpse *goraiko*, or sunrise, from the highest point in the Land of the Rising Sun.

Our foursome, including my guide, Mune-taka Yaginuma, and godson, Arthur Mitchell, a student of Japanese literature, fit right in. We started up with gusto at 11:30 p.m., but as dawn lightened the sky, the thin air and lack of sleep slowed us to a head-bowed crawl. Then, nearing the summit, a sudden miracle—a luminous egg yolk peeped through ruffled clouds, spreading golden fluid through the heavens. Climbers halted to savor the moment. Some applauded. Others whipped out cell phones, describing the scene for loved ones back home. Elated, possibly from oxygen deprivation, I called my brother Dave in Seattle.

Gerry, rejuvenated, looked like a man who had planted a flag on a distant planet—"Spectacular," he beamed.

It's hard to overstate Fuji's magnetic pull. Its solitary cone rises from the Fossa Magna, a tectonic hinge that bisects Japan's boomerang-shaped main island, Honshu. With its flattened top, Fuji-san, as the Japanese call it, resembles a giant mound of powder (flour in winter, graphite in summer) sifted onto a cookie sheet, and on a clear day can be seen from Tokyo, 70 miles away.

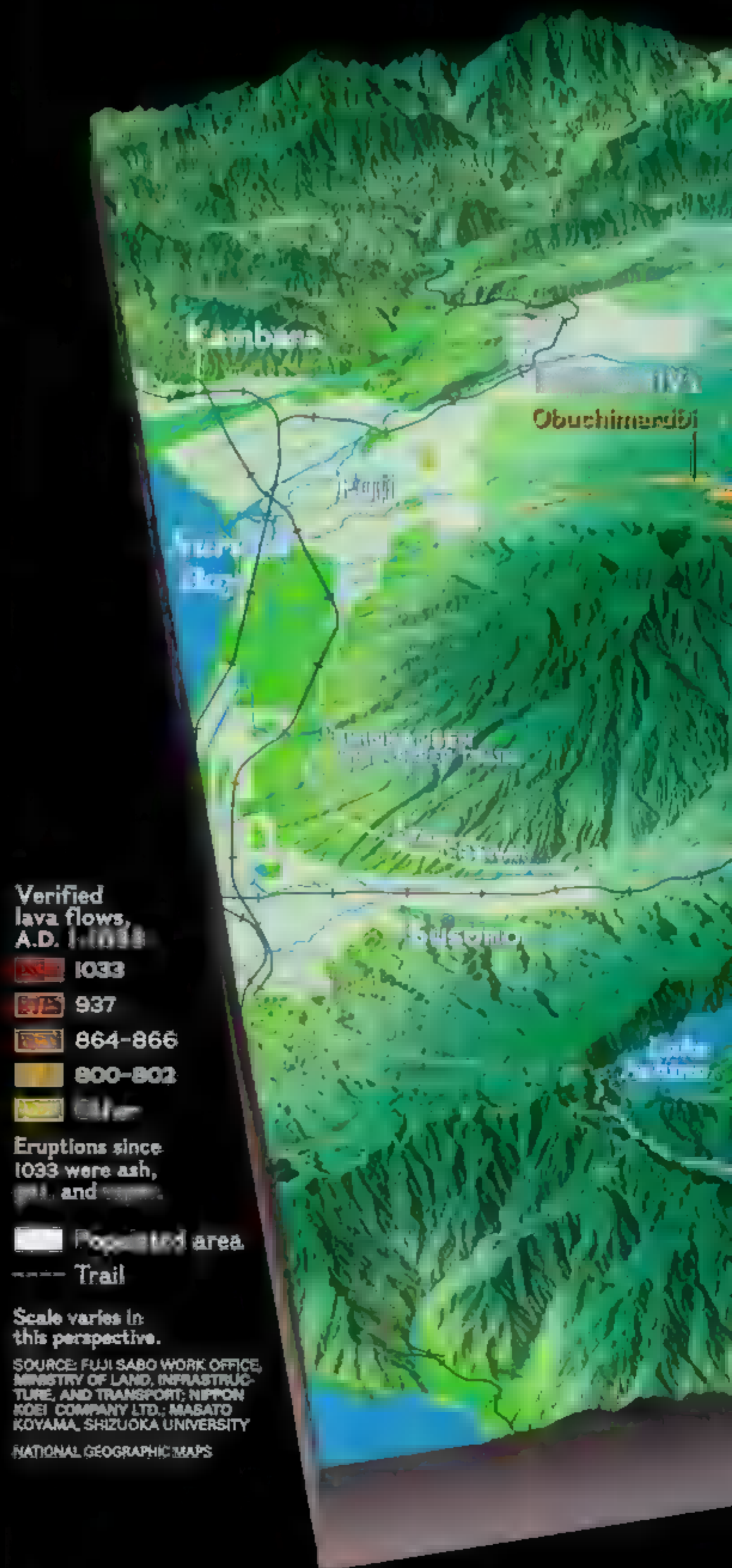
For centuries Japan's holiest of natural sanctuaries, Fuji shows up today in more worldly ways—as a popular brand of mineral water and a lucky logo for hundreds of businesses, including multinational giants Fuji

EYEING ANOTHER EXPLOSION?

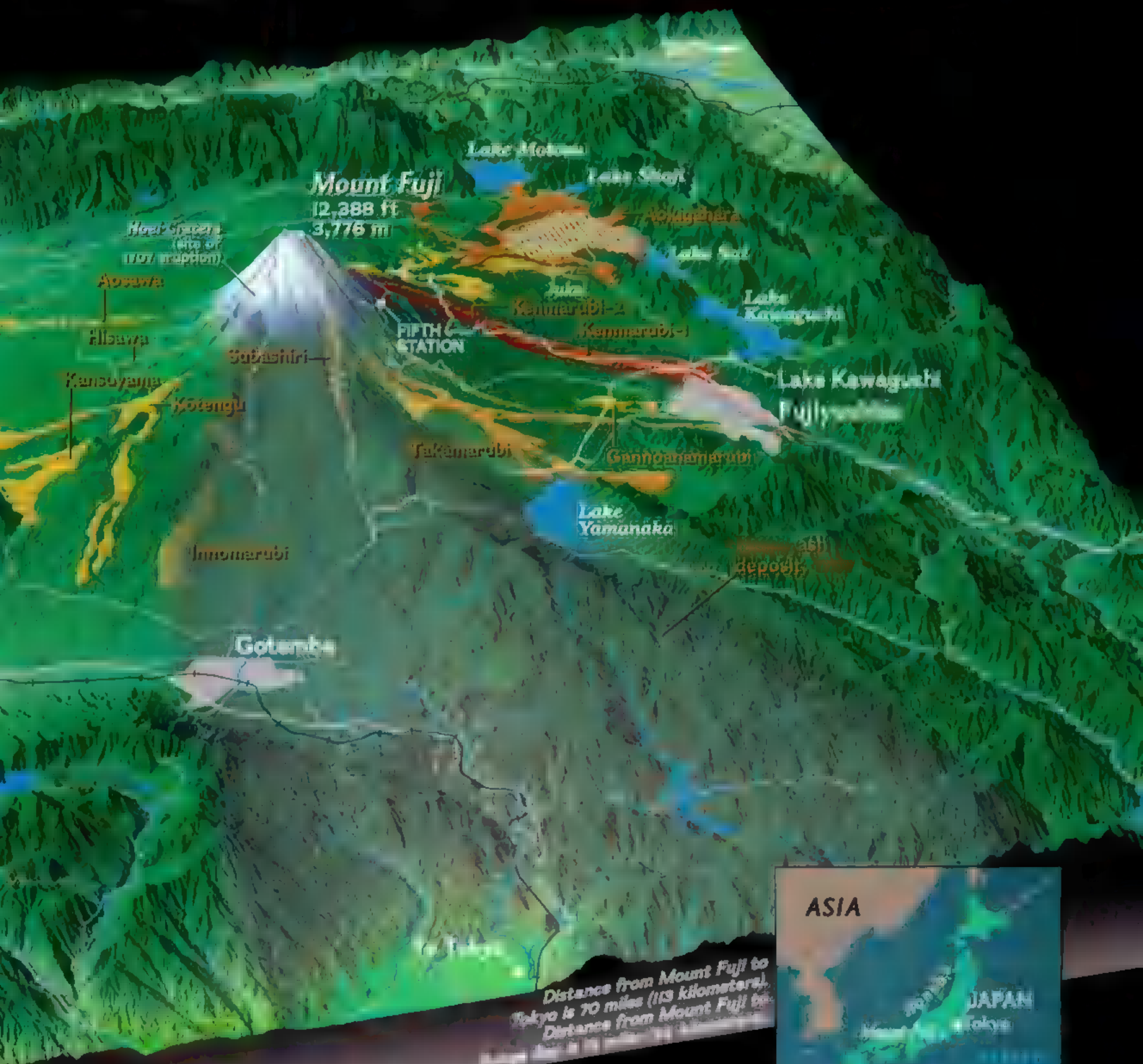
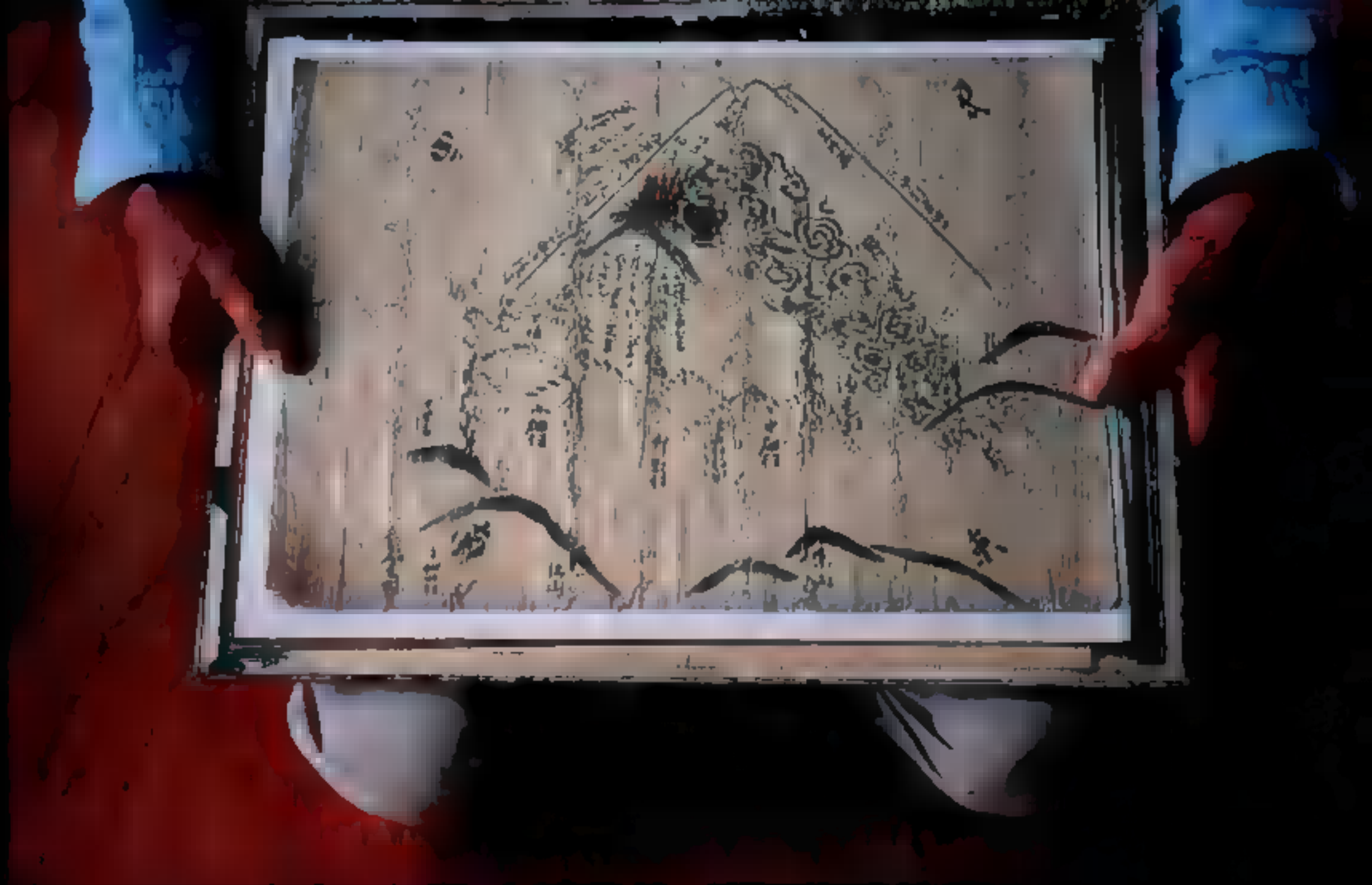
Almost 300 years have passed since Mount Fuji last erupted, and no one knows how long this lull will last. Sitting atop the fault of a geologic seam of colliding tectonic plates that arcs around the Pacific Ocean, Fuji has erupted at least ten times since the 17th century (map, below). Layer

upon layer of lava and ash has helped make Fuji the tallest mountain in Japan.

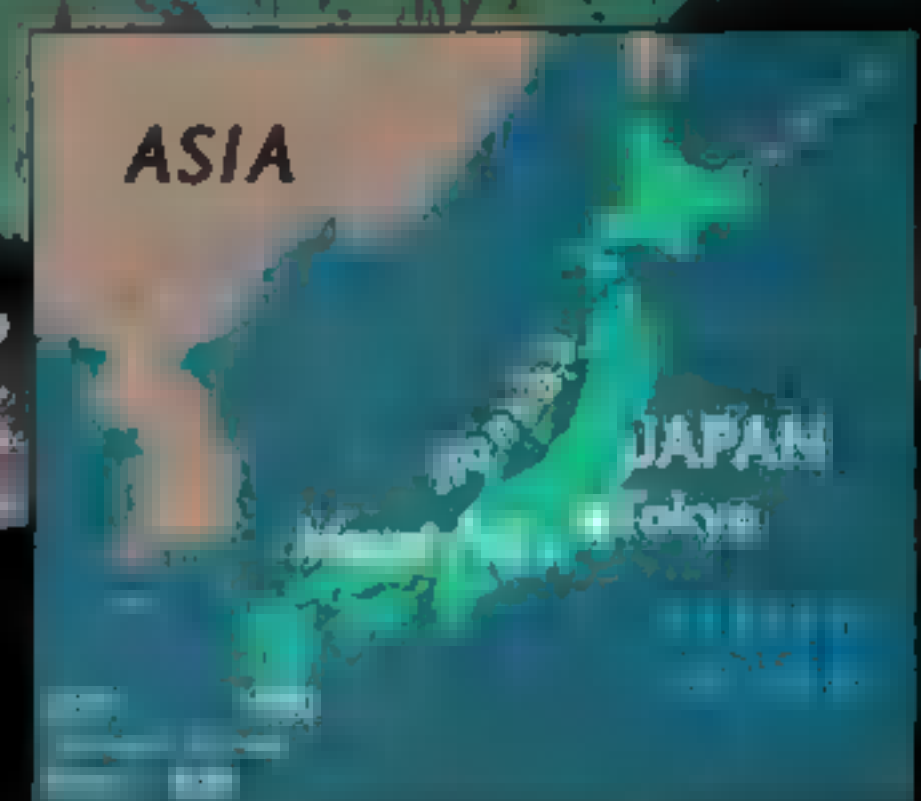
The last time Fuji erupted, in 1707, it blanketed Tokyo, 70 miles away. A volcanic deposit of that eruption is held as an heirloom by Fumio Takiguchi (right). His family received it

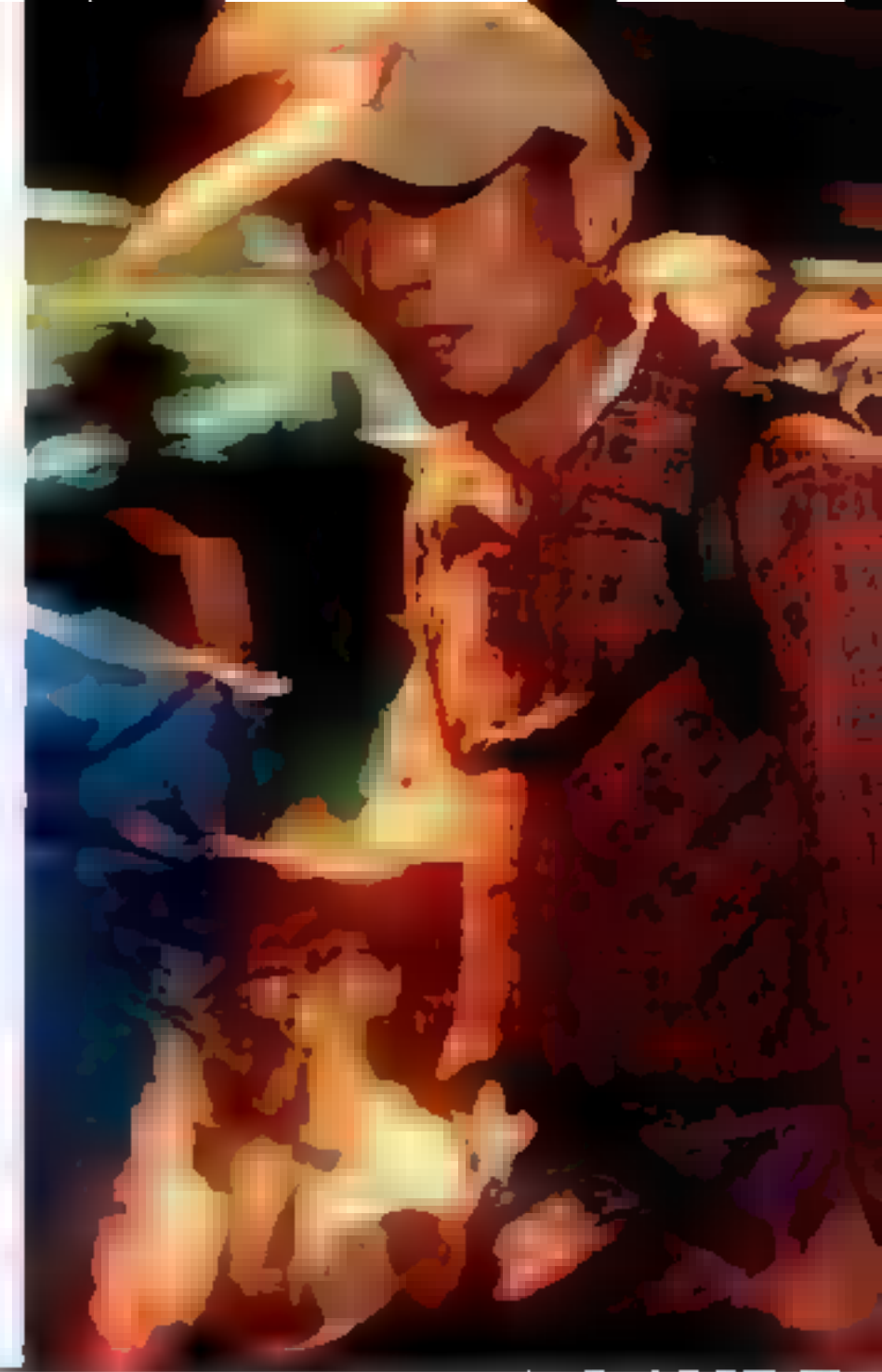


generations ago from an itinerant laborer, who offered the service to his hosts in pay for room and board. "It may be dangerous to live here, but we take it seriously," says Takaguchi, who wisely has mapped out escape plans for his family from their home in Gotemba. Based on recent data, some volcanologists suspect Fuji may erupt again.



Distance from Mount Fuji to Tokyo is 70 miles (113 kilometers).
Distance from Mount Fuji to...







Looming near Japan's center, Mount Fuji is a point of pilgrimage for hundreds of thousands of people who converge here each summer to climb it (left). Some do it for their souls, others for the challenge. Many climbers begin their ascent around noon, so they can stand atop the 12,388-foot summit at sunrise the next morning. On the way up Norimitsu Sasaki and his son, Junshi, inhale oxygen from canisters (far left), a popular way to get some extra gas. "And I thought Mount Fuji was a very gentle and easy mountain to climb," says Junshi.

UP A SPIRITUAL CITADEL

Photo Film and Fuji Xerox. "Japan without Fuji," one veteran climber told me, "would be like America without the Statue of Liberty."

Fuji's psychic hold was evident the day I visited Hikotaro Omata at his home on the shores of Lake Kawaguchi, one of five lakes bunched along its northern slopes. "I was a climbing guide for 60 years!" cried the squat 80-year-old, whose barrel chest and earthy manner suggested he might have grown directly out of the side of Fuji itself. "I went to the top more than 800 times!"

I was feeling less the fool for climbing Fuji only twice, when Omata-san fixed me with a steely gaze and declared, "Fuji-san saved my life!" In World War II, he said, Japan was still the "land of the gods," but he was in the jungles of New Guinea, a soldier in the emperor's army, when Fuji appeared to him in a vision. "I was nearly dead from starvation," the old man said. "And she was snowcapped and beautiful!"

So when Fuji thundered, "Return and climb me!" Omata-san had to obey. But the old magic faded fast during Japan's postwar "economic miracle." In the 1960s a famous pop crooner hired Omata to help carry up a grand piano for a concert. "We got all the way to the top," he said, "when word came this singer fellow wasn't feeling up to the climb."

There was that look again. "It'd taken us three days!" barked Omata-san. "They could've flown the damn thing up in a helicopter for less money!"

In the month I contemplated Fuji, I inscribed erratic circles around the great mountain, driving the back roads and highways, and found people, old and young, who



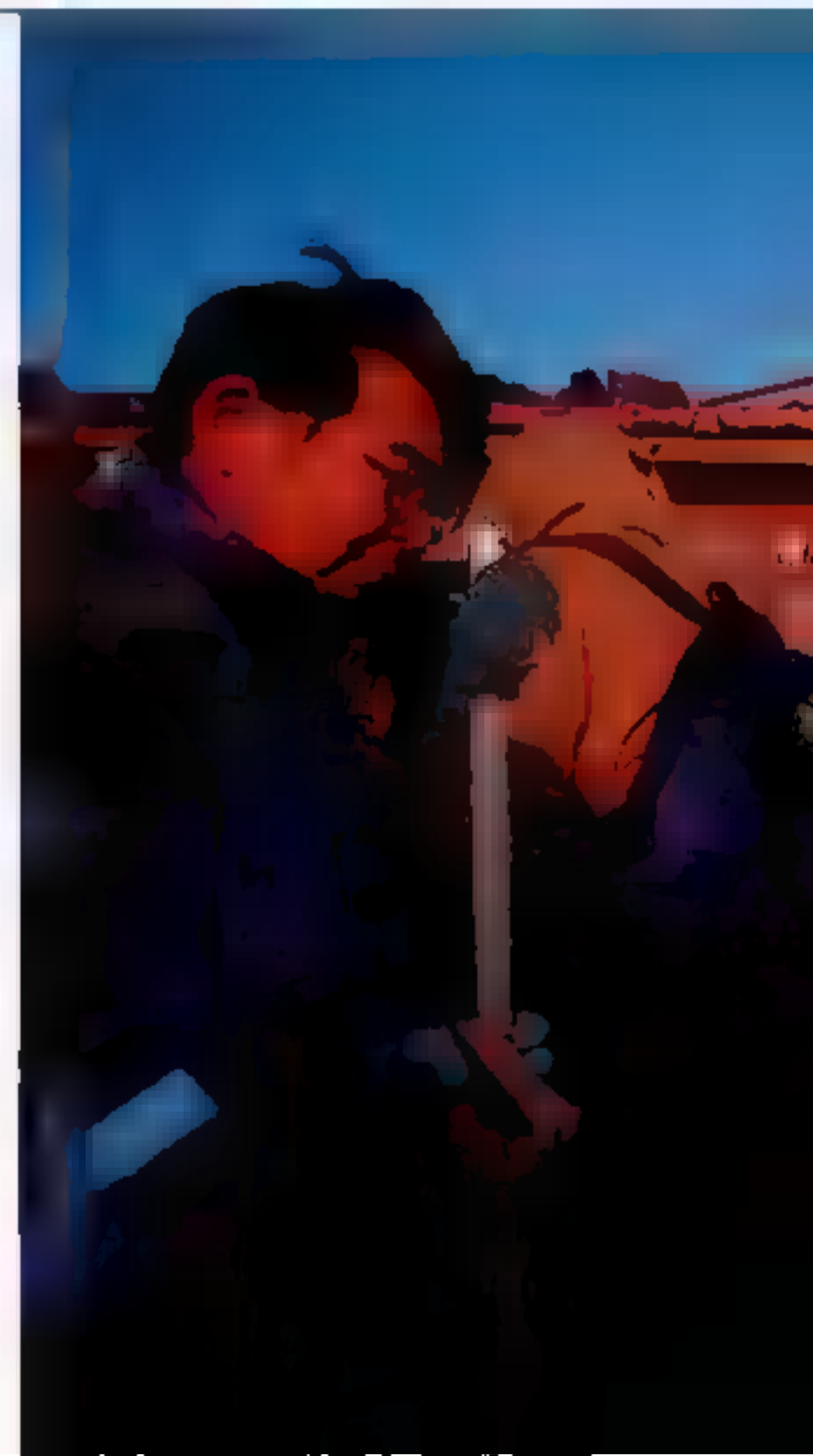
TO THE SUMMIT

At 2 a.m., as climbers mill beneath a sacred Shinto gateway,



some begin to fade—but then a voice cracks the chill air: “Ganbama!—hang in there!”







vibrated with the mountain's offbeat energy, defining it in unique ways. A graying ex-flower child spoke of Fuji as the "chakra of Japan," its point of maximum spiritual potency. A savvy Shinto priest had converted the faith of big-money patrons in the mountain's legendary healing powers into a clutch of gleaming gold-and-marble pavilions near Fuji's wide foot. A rapt UFO-watcher told me in hushed tones of the starry night a spaceship hovered over Fuji, drawing energy from a secret geomagnetic dynamo buried inside.

Fuji-san, thrusting toward the heavens, said 51-year-old educator Yasuo Miyazawa from his hilltop school overlooking the mountain, "gives my students the courage to pursue things."

Only fear of Fuji's fury may run deeper than devotion in Japan's collective consciousness. Records show that since A.D. 781 the mountain has erupted at least ten times, with flaming skies and molten rivers. Its last blowout, in 1707, followed a colossal earthquake estimated today at magnitude 8.4. (The 1995 Kobe quake, which killed 6,400 and caused massive structural damage, registered 7.2.) It cratered Fuji's southeast face, raining ash so thick, one diarist noted, "We lighted candles even in the daytime."

Old phobias rekindled two years ago when Motoo Ukawa and his colleagues at the National Research Institute for Earth Science and Disaster Prevention near Tokyo detected a surge in seismic activity under Fuji's cone. "Low-frequency earthquakes," said Ukawa as he clicked on a computer screen to reveal

LAND OF THE RISING SUN



At 9,908 feet (top) the view during the day goes on and on—but at night many climbers can't, so they stop at one of several huts for a bite to eat and ■ short nap. (Later, workers air out the futons.) Atop Mount Fuji the rising sun greets pilgrims as well as apprentice Shinto priests (left) who, during the summer, live and worship at a shrine on the summit. Japan's native religion, Shintoism considers natural wonders such as Fuji to be dwelling places of the divine and worthy of reverence. Many climbers also deem their trek noteworthy, so along the way they stop to send ■ postcard to the folks back home (far left).

a contour map swarming with tiny red splotches. "We think they're related to deep magma flows."

Ukawa, the institute's director of eruption prediction, stood next to me in his monitoring lab where machines receive data from seismometers planted around Fuji, sent in over telephone lines 24 hours a day. Yet Ukawa, a shy man of 47, confessed he couldn't say why the low-frequency quakes had continued to worry his machines with readouts that looked like heart attacks on graph paper.

Unlike ordinary fault-slip earthquakes,

volcanic eruptions elsewhere in the archipelago, had sent mild tremblings through the rest of the country.

Some weeks later, as I left one of Fuji's steamy hot springs resorts, my laconic taxi driver clued me in. "People here think about *funka*"—eruption—"all the time," he said. But they were reluctant to publicly deal with the issue, "because it might scare tourists away."

I got his point. Upwards of 25 million visitors descend on Fuji's laxly zoned commercial periphery each year. The estimated 1.5 billion dollars they spend at roadside venues (from the

HE TOOK A HIT FROM AN OXYGEN CANISTER AND STARED AT ME. "MY

Ukawa's tremors are usually imperceptible—and so numerous they're measured in bursts. Unlocking the mystery of what triggers them, he and others believe, will provide a key to predicting when Fuji, the biggest of Japan's 86 active volcanoes, might roar back to life.

Time is of the essence because Fuji's next blowout could cause havoc, immolating the used car dealerships, fast-food pit stops, and housing developments along the mountain's encircling highways. Worse, it could spew deadly ash and gases over the greater Tokyo area, where a quarter of the country's 127 million people now live and work.

So far, Fuji's mini-quakes have stayed put—6 to 12 miles below the surface, a depth Ukawa believes argues against imminent explosion. "But we've got to be prepared," he warned.

How tall an order that was became clear the morning I stood in the soft spring sunshine near Lake Kawaguchi's town gymnasium in the broad, rolling uplands eight miles north of Fuji's summit. Suddenly a voice blasted from the loudspeakers: "Fuji has erupted! Forests are ablaze!"

The alert, announcing the start of the largest eruption drill ever held near Fuji, belied an atmosphere that was more country fair than impending catastrophe. Hundreds of neighbors—parents, kids from the nearby junior high school, and local officials—milled around the playground, eating rice balls and gawking at rescue helicopters that hovered like dragonflies.

Their understated response struck me as odd. Overheated media reports on the discoveries in Ukawa's lab, in addition to two recent

world-class Fujiyama roller coaster to a motor speedway and a safari park, complete with giraffes and zebras, that uses Fuji as a stand-in for Kilimanjaro) are critical to preserving local jobs.

Cheesy commerce had reduced towering Fuji to its nadir when I first climbed it back in the mid-1970s. A decade earlier Japan's booming economy dynamited a new highway halfway up the mountain, and an unstoppable rush of day-trippers was on. Still smooth-shouldered and enchanting from afar, Fuji at boot tips was besmirched by scruffy vendors, panoramic trash, and a troubling lack of toilet facilities.

Energized by the squalor, local citizens eventually collected 2.4 million signatures on a petition to protect Fuji by having UNESCO declare it a World Heritage site. But after an informal visit in 1995, representatives bluntly told their hosts to fix Fuji's problems or forget applying. That wound to national pride unleashed a cleanup campaign so vigorous, old Fuji hands told me, that volunteers from schools, community groups, and companies occasionally lapsed into shoving matches over scraps of refuse to claim as trophies. Such dustups are rare, but Fuji's protectors remain vigilant.

"I saw a boy throw a bottle away just now," said Mitsuko Saito, a young radio personality I met last year as I fell into step with a group of disc jockeys heading up the mountain on a highly publicized trash-hunting mission. "The Japanese have no garbage consciousness!" she said. "I will report to my listeners!"

The self-policing has burnished Fuji's appearance, but as Toyohiro Watanabe, who

heads the nonprofit Fujisan Club, said, the unrelenting tourist offensive has overwhelmed facilities, including the few ecologically correct “bio-toilets” his organization has installed.

It’s too early to tell where a debate might lead over levying the kind of entry fees U.S. national parks charge to pay for upkeep. Meanwhile, Japan’s military routinely conducts artillery practice near Fuji, lobbing live shells in the mountain’s direction.

“It’s funny,” said a Tokyo newspaperman, “people don’t care that they’re shooting at the national symbol.”

bone. Stuck to the side of a collapsed tent were clumps of thick black hair.

“Thirteenth body I’ve found,” the man said matter-of-factly. But there was in fact no body or ID, just the possible traces of a tragedy. A woman put her palms together in prayer, then the jaunty spelunkers were off galumphing through the dense pulpy forest, laughing and joking.

That struck me as callous. Somewhere, surely, old parents pined for word of missing children. A homemade poster tacked to a trail gate said as much. It asked for help in locating a 36-year-

BRAIN MUST HAVE REALLY SHRUNK TO LET YOU TALK ME INTO THIS.”

Fuji’s *jukai*, or sea of trees, is its garden of dark visions. This swath of old growth forest northwest of the summit, deep and tangled as a fairy tale, is infused with caves formed by lava flows cold now for a thousand years. From a cloistered compound on its verge Aum Shinrikyo, a fanatical religious cult, staged a poison gas attack on Tokyo’s subways in 1995, killing 12 and sickening thousands. But today the *jukai*’s beauty belies its image as the suicide capital of Japan.

“This is where people go in and don’t come out,” said my guide one sunny Saturday morning when I joined a group of cave explorers at the entrance gate where Fuji’s lower flank gently tilts upward. It was barely 11 a.m., but the forest was already in twilight. Tree roots roiled the hard lava crust like moss-covered snakes. “That’s the tree,” said our leader, pointing, “where, two years ago, we found a human head in the branches”—the remnants of a self-inflicted hanging.

Too many such grisly discoveries had led local firemen to stop yearly cleanups for fear that media coverage of the bodies only added to a national suicide rate that was soaring in the midst of Japan’s deepest postwar recession.

I was shining my flashlight inside a low vine-covered cave, watching a caver wriggle forward on his belly, when one member of our group, ■ brusque man with penetrating eyes, said, “I found some bones over there.”

He led me toward the ruins of a campsite that rose from the underbrush as we approached. There was a soggy green tarp tied between two saplings, a muddy sleeping bag, an empty gas can—and a nondescript pelvic

old salaryman and displayed a weathered snapshot. Through the cracked emulsion you could make out high, round cheekbones, a haunting, almost girlish smile, and the pomaded hair of a vanished man.

Tramp around Fuji long enough and you’ll very likely trip over some obsession of your own. I proved that when, at journey’s end, I found myself trudging up the mountain’s gravelly trails once again, my knees still hurting from my earlier ascent. I’d heard that one of Japan’s big daily newspapers was sponsoring a climbing expedition for young cancer survivors. As a fellow survivor for whom Fuji’s rigors had a special meaning, I was curious to see what the mountain would mean to them.

It was late summer, and the road up was a green tree-lined chute with Fuji at the end—a vibrant red immensity. But by the Fifth Station, where the highway ends and the main climbing trail begins, the peak had transformed itself from red to a dusky emerald green. The Fuji-obsessed had told me the peak shifted moods like a quick-change artist, and I was getting the point—underscored two days earlier by a freak lightning storm that had killed a 61-year-old climber near the summit.

On this day hundreds of happy greenhorns panted in the hot sun, crowding trail turns as if waiting for an escalator. Panting a little myself, I encountered Tomoko Omata resting over a cup of green tea inside one of the many ramshackle huts where climbers can buy sodas or candy bars or rent a few square feet to catnap at ridiculously inflated prices.

“I had a tough time getting this far,” said Omata-san, 32, who had leukemia at age 13.



MOUNT USUKITOU

This name of Full— is a Tokyo bathhouse as



ジェット浴 座風呂

バブ 気浴浴

well as myriad Japanese products—endures as a national symbol of serenity and strength.

For soldiers of the Japan Self-Defense Force, who train at the foot of Fuji (right), the mountain is the peak of national pride. For laborers preparing red-dyed, sun-dried shrimp in Kambara (bottom), it's the famous neighbor. And though it helps shape the Japanese diet—inspiring truncated triangular sponge cakes, rice crackers, rock candy, and jellied bean-paste snacks (far right)—Fuji's familiarity does little to weaken its magnetic, almost oracular, power. In the words of poet Shinpei Kusano: "I'd like to see Fuji speak one word. In the language of human beings."



AN ETERNAL PRESENCE

"Really tough," chimed in Yoko Nomo, 27, who survived a brain tumor, "but Fuji-san is the number one mountain in Japan!"

When I told Omata how event sponsors had tried to keep me, a reporter, from joining her, she smiled wearily. "We need the media," she said. "When young people get cancer in Japan, everybody thinks they're going to die." Families are overprotective. Companies won't hire. Potential mates pass them by. "Many survive," said Omata, "and people need to know that."

"You should have seen us on the bus ride up," Nomo broke in, her face glowing in the hut's dim light. When they slipped above the clouds and Fuji revealed itself, it was such a thrill, she said, "Everybody started clapping!"

"Till then nobody knew what climbing a mountain meant," said Fumiko Ikeda, a social worker and chaperone. I understood. But gazing at the canny faces around the table, I also knew that each of these women was a seasoned veteran in treading the uphill path. Today Fuji-san, the culture's malleable old symbol, had simply confirmed that fact for them.

And that got me to thinking. Maybe it was time to retool that old proverb about Fuji and fools, the first part of which says the man who climbs but once is wise indeed. Lucky enough to get a second go, I realized how many people grew just a little taller in spirit from any opportunity to measure themselves against Japan's inevitable mountain. □

MORE ON OUR WEBSITE

Interested in climbing Mount Fuji yourself? Get travel tips in our Online Extra and find related websites ■ nationalgeographic.com/ngm/0208.









The Hell Hole

... bound wrists and bat-
... endured the Atlantic crossing
to the West Indies, a journey
of three months on average.
Seasick passengers were the first
... submission, deprived of
... air, weakened by illness
... and fouled by excrement.
... and others claimed
... and crew alike
... one in five perished.
Prisoners who died were
thrown to the sharks that
swam in the slaver's wake. In
a ... scene below-
decks ... crewmen remove
a dead slave from the stifling
bowels of the ship as a man
... for a dying child, far
left. In her two ... the
... the first merchant-
ship-turned-slaver ...
... delivered some 450
Africans to lives of servitude.

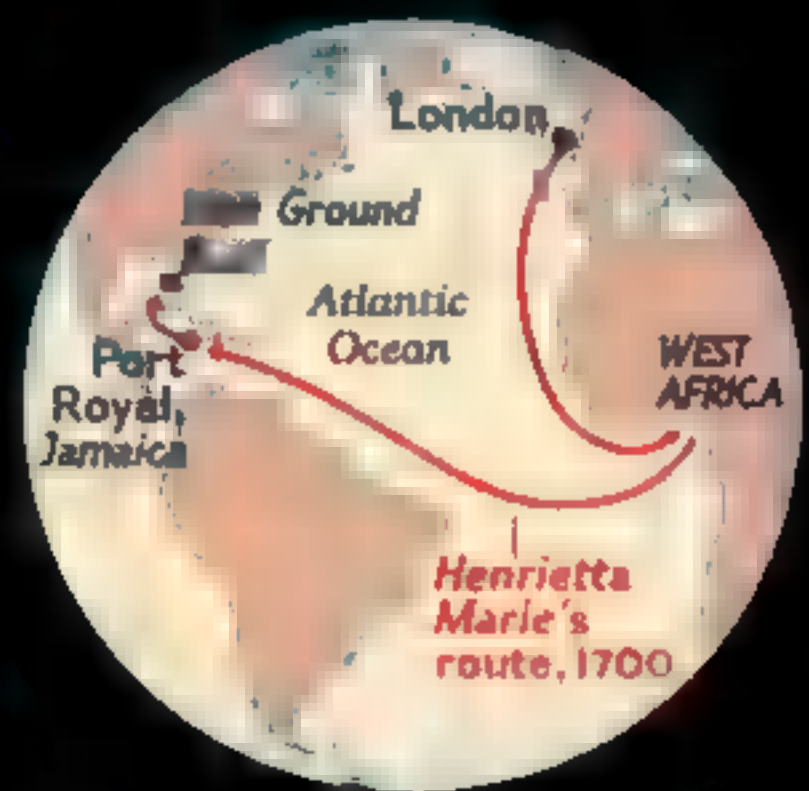
A grim face on a European jug, relic from the sunken slave ship Henrietta Marie, witnessed the horrors of human bondage. New study of this 17th-century vessel, the oldest slave ship ever excavated, helps tell the story of the millions whose lives and identities were lost.



Last Voyage of the
SLAVE SHIP
Henrietta Marie

By **JENNIFER STEINBERG** • Photographs by **COURTNEY PLATT**
NATIONAL GEOGRAPHIC WRITER



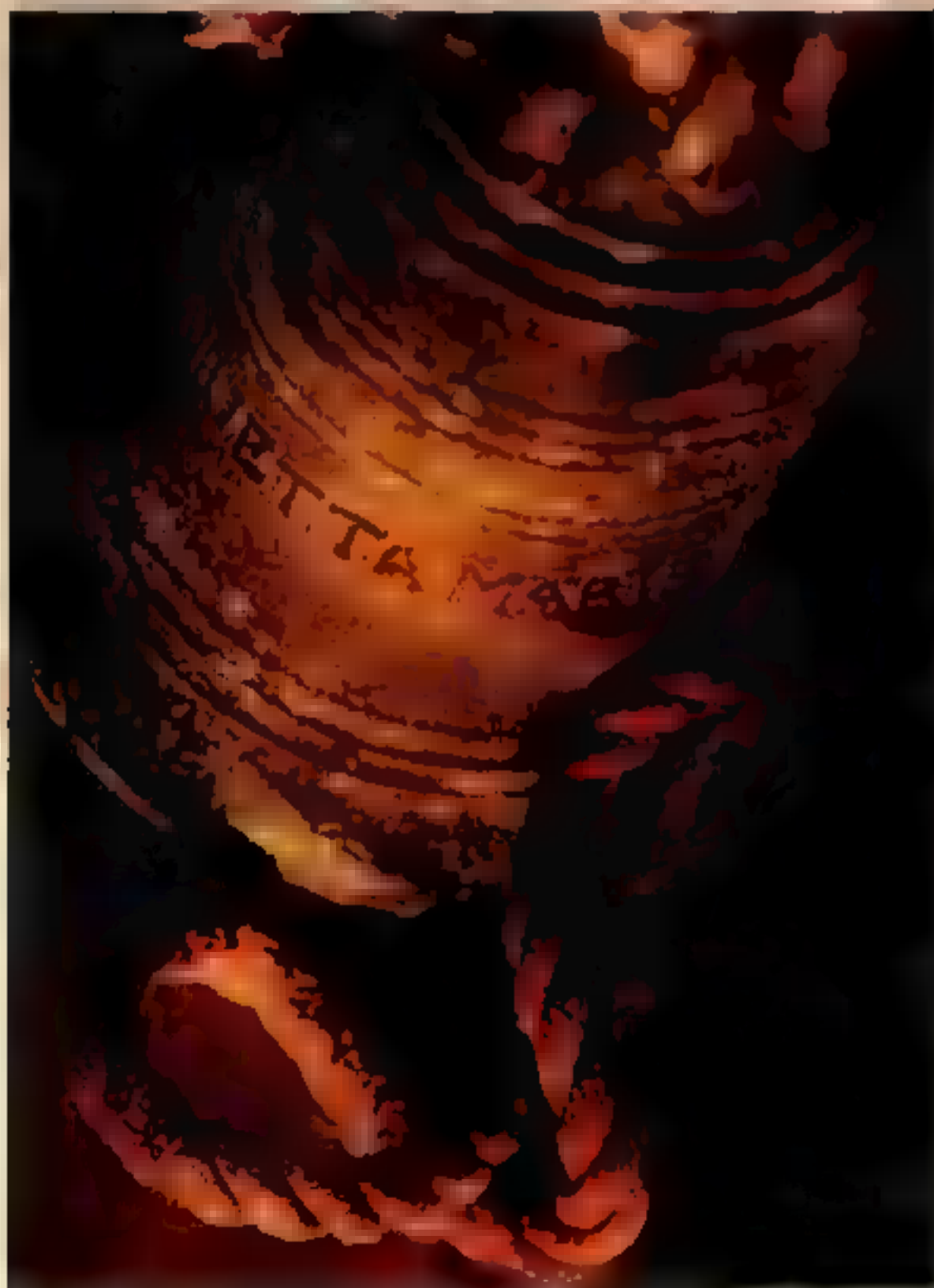


"Shackles are the icon of the slave trade," says Malcom, current director of the ship's excavation. The iron restraints, of which more than 80 have been recovered from Henrietta Marie, represent the denial of liberty that defined slavery but also testify that captives rebelled against their plight. At least ten million Africans over some 200 years endured the infamous Middle Passage, one leg of a triangular trade route that led from Europe to Africa to the West Indies or Americas, and then back to England.

IRON BLOCK (LEFT, FAR LEFT); NG MAPS (GLOBE); ALL ARTIFACTS: MEL FISHER MARITIME MUSEUM, KEY WEST

London 14 Sept
John Thomas Pipe to the Par
Int 1728 A

She was a British merchant ship employed in cruel commerce, her sweltering hold crammed with human chattel. It was the 18th of May, 1700, and the *Henrietta Marie* was nearing the coast of Jamaica, her final destination before the long ride back to England. The ship



Found in 1972, the ship was known only as the "English wreck" until a diver spotted her bell 11 years later. "It bore the ship's name and the date the bell was cast [1699]," says marine archaeologist David Moore, driving force behind the latest effort to learn the ship's secrets.

had left Africa with as many as 300 captives sold into slavery by fellow Africans—likely of rival tribes—mostly for iron and copper bars offered by the British crew. Many died along the way; slave-ship mortality averaged 20 percent. As land appeared on the horizon, Captain Thomas Chamberlain, anxious to conduct business, ordered his crew to prepare the prisoners for arrival. Goaded onto deck, men, women, and children were fed, cleaned, shaved, and oiled, their wounds finally tended, in preparation for sale.

At Port Royal, naked and in chains, slaves went on the auction block. Potential buyers might prod their bellies, poke fingers in their mouths to check their teeth, and even taste their sweat—thought by some to be a gauge of health. By one estimate *Henrietta Marie*'s cargo grossed well over 3,000 pounds (more than \$400,000 today) for the ship's investors. Most of the captives were headed for sugar plantations where they'd be worked to exhaustion, many dying within five to ten years.

Their fate was not Chamberlain's concern. Captain and crew weighed anchor in late June and set a homeward course, their ship now packed with New World sugar, cotton, wood, indigo, and leftover trade goods. But storms plagued their exit and the ship foundered on New Ground Reef, 34 miles off Key West, Florida. All aboard perished at sea.

It was nearly 300 years before treasure hunters, employed by salvager Mel Fisher, raised the first relics from the wreck. But their passion was gold, and they soon abandoned the slaver to search for richer ships. In the 1980s and '90s other divers continued the salvage as scientists began conserving the rescued items. Today those scientists are in the water, examining the ship's fragile hull and coaxing the last artifacts from the sand. Their work is key: *Henrietta Marie* is the oldest slaver ever excavated and one of only a handful from American waters. Says marine archaeologist David Moore, "She's a vital piece of history."

8: 1099
Arising By Act of Parliament

Crouched on the deck of a replica 17th-century ship, swashbuckler John McGaughey wields a cutlass from Henrietta Marie in this photograph from 1972—the year he and other salvors stumbled on the slaver while seeking the Spanish galleon Atocha. A record of the 10 percent tax (background) paid in London for the legal right to trade slaves lists the ship's original cargo, telling researchers what might still be lost at sea—including more cannon, pewter, and thousands of glass beads.



DON KINCAID (ABOVE); PUBLIC RECORDS OFFICE, LONDON (BACKGROUND)



Like a dead man's chest, the ship's hull split open to her port. On a recent dive, Moore recorded plumb dimensions and structural details to learn how Henrietta was assembled and how she sailed. Ken Malcom, 2007



at left, sand helped the ship's timbers
slave traders than normal vessels," Moore says. "The well-
allows us to test so it becomes the most artifact."

TO BE SOLD on board the

Ship *Bance-Island*, on tuesday the 6th of May next, at *Ashley-Ferry*, a choice cargo of about 250 fine healthy



NEGROES,

just arrived from the Windward & Rice Coast.



—The utmost care has already been taken, and shall be continued, to keep them free from the least danger of being infected with the SMALL-POX, no boat having been on board, and all other communication with people from *Charles-Town* prevented.

Austin, Laurens, & Appleby.

N. B. Full one Half of the above Negroes have had the SMALL-POX in their own Country.

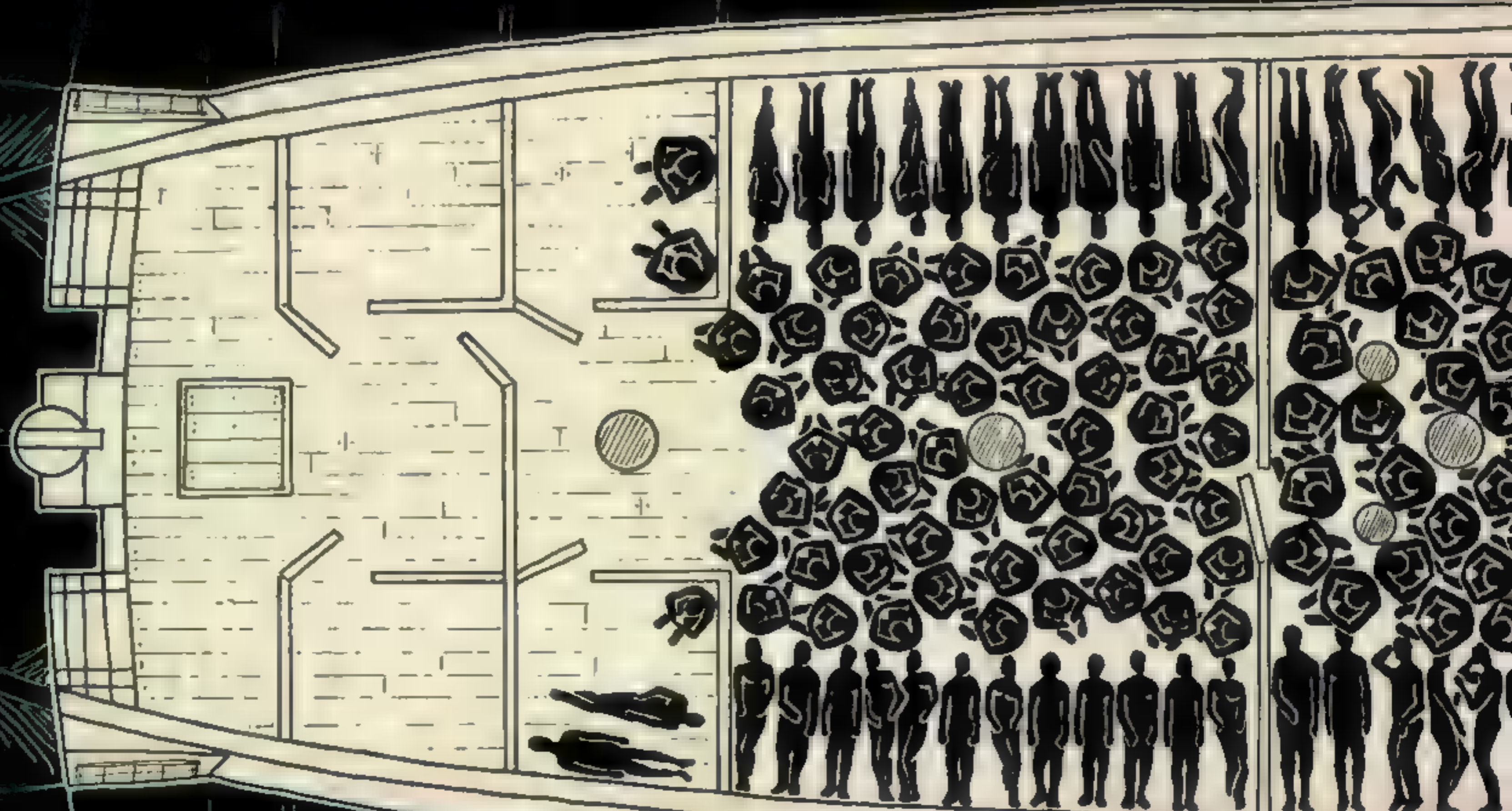
to name their price. Anti-slavery art of the same century (right) is more humanistic, but even it belies their suffering, portraying women captives as willing, even smiling, participants. Slaves' individual stories were all but lost, even in historical accounts of voyages. "This business was impersonal, and it was meant to be that way," says Corey Malcolm. "If you dehumanize your victims, you don't have to feel for them."

The victims on *Henrietta Marie* were probably Ibo, a tribe from what is now eastern Nigeria. The Ibo, according to proverb, "made no kings"—all men had the potential to lead. That philosophy was lost on those who forced them aboard ships packed to the

Lives Bought, Shipped, Sold

Born of an industry of cold efficiency, an 18th-century colonial advertisement for "fine healthy negroes"

(above), decorated with iconographic grass-skirted "natives," lured potential buyers with cash in hand

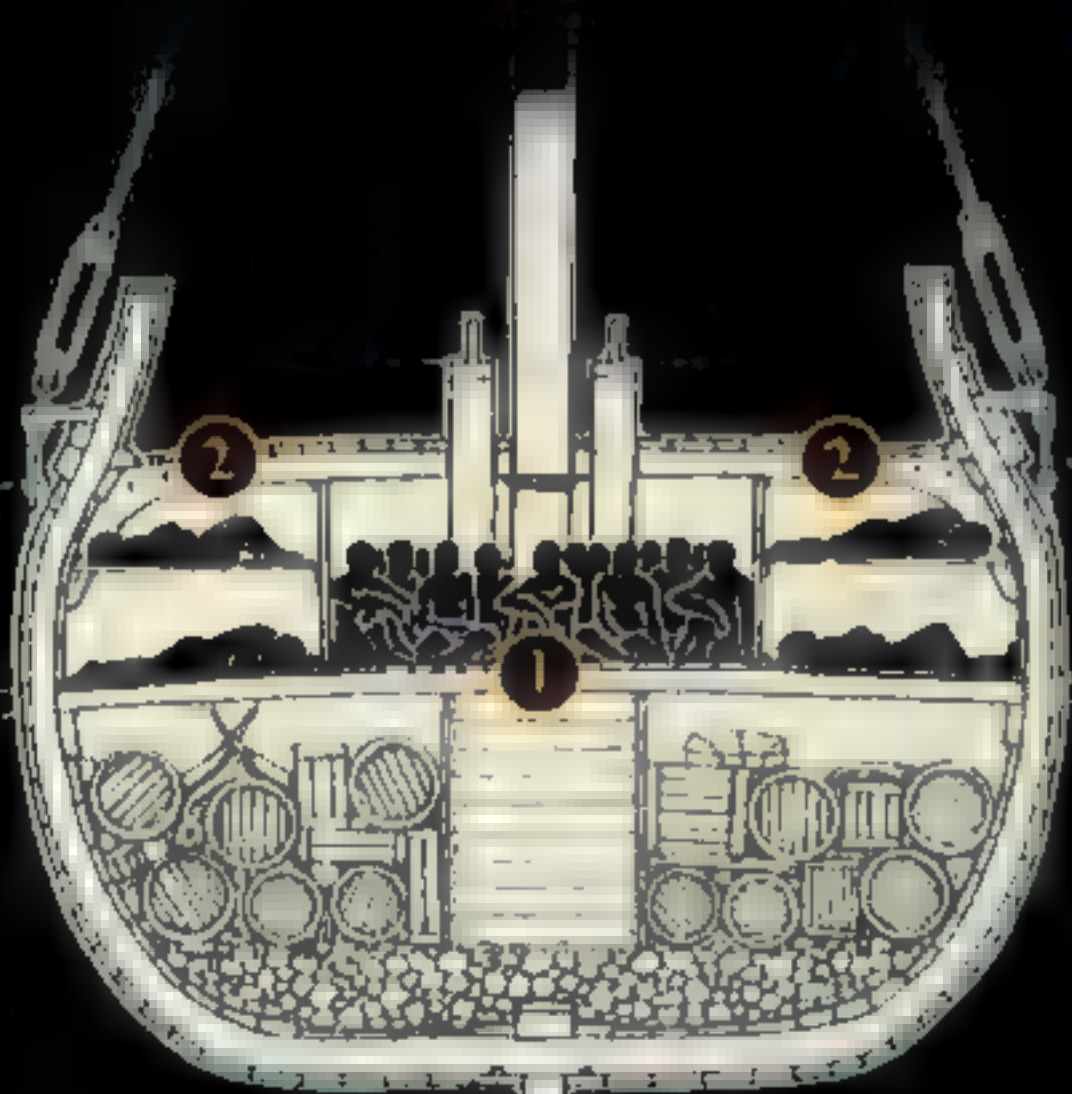


LIBRARY OF CONGRESS

gunwales to maximize economic return. (The practice actually led to higher mortality and financial losses.) With 18 inches, left to right, of floor space each and five feet of headroom, captives on the "slave deck" ① (below and bottom) sat, crouched, or lay on their sides. Half decks ② were built to stow additional slaves in tiers. Henrietta Marie could have held 400, though records suggest she was never filled to capacity.

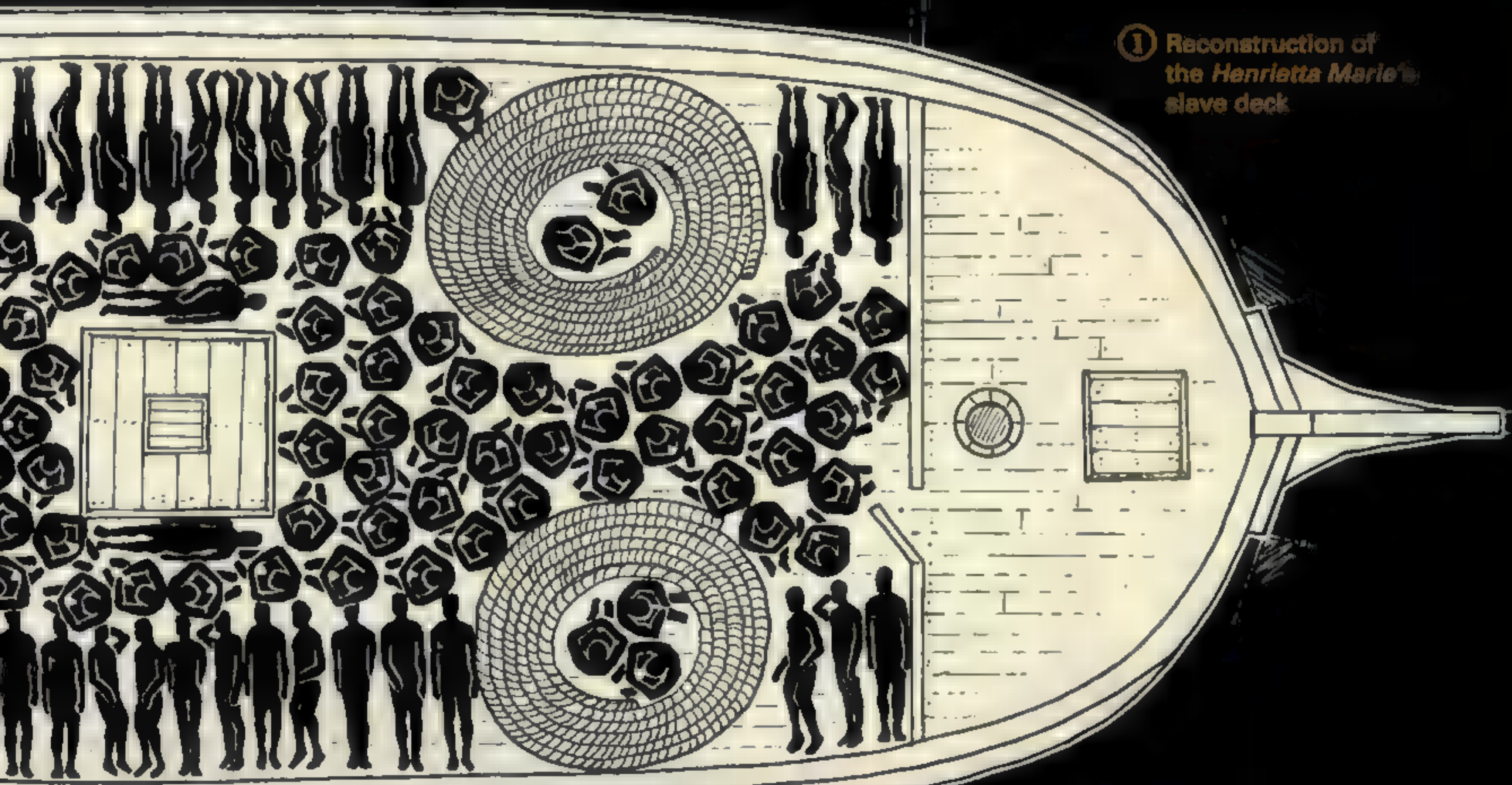


ENGRAVING BY WILLIAM BLAKE. JAMES FORD BELL LIBRARY, UNIVERSITY OF MINNESOTA



Ultimately, Africans proved hardier and less likely to flee than the Indians colonists had enslaved before them. "Ironically, the fact that Africans were

strong and did well under duress was to their detriment," says historian Madeleine Burnside. They became the slaves of choice in the New World.



① Reconstruction of the Henrietta Marie's slave deck





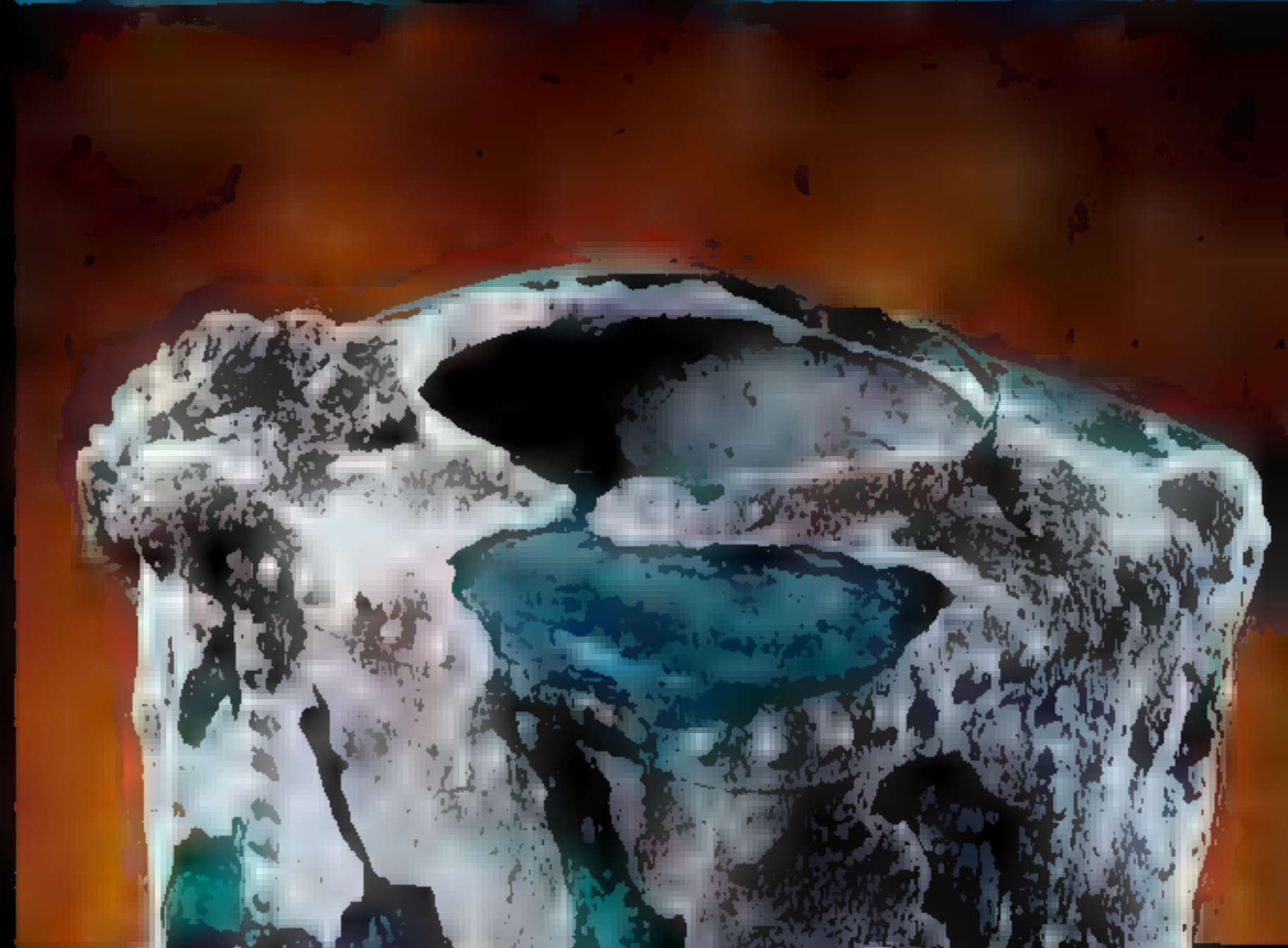
The Price of Life

In the summer of 1482, West Africa's coastal markets were busy with the exchange of goods. Iron bars (above) were used to buy slaves. It took 100 pounds of glass beads (left) to buy a life; slavers also bartered with cowrie shells (below), which were used to buy trade goods that went back to Europe or, in Marie's case, sank in the Gulf of Mexico. The huge copper cauldron (right, with dishes and bottom right) once



JOSÉ MOLINA; DYLAN T. KIBLER; MEL FISHER MARITIME MUSEUM (IRON BARS)

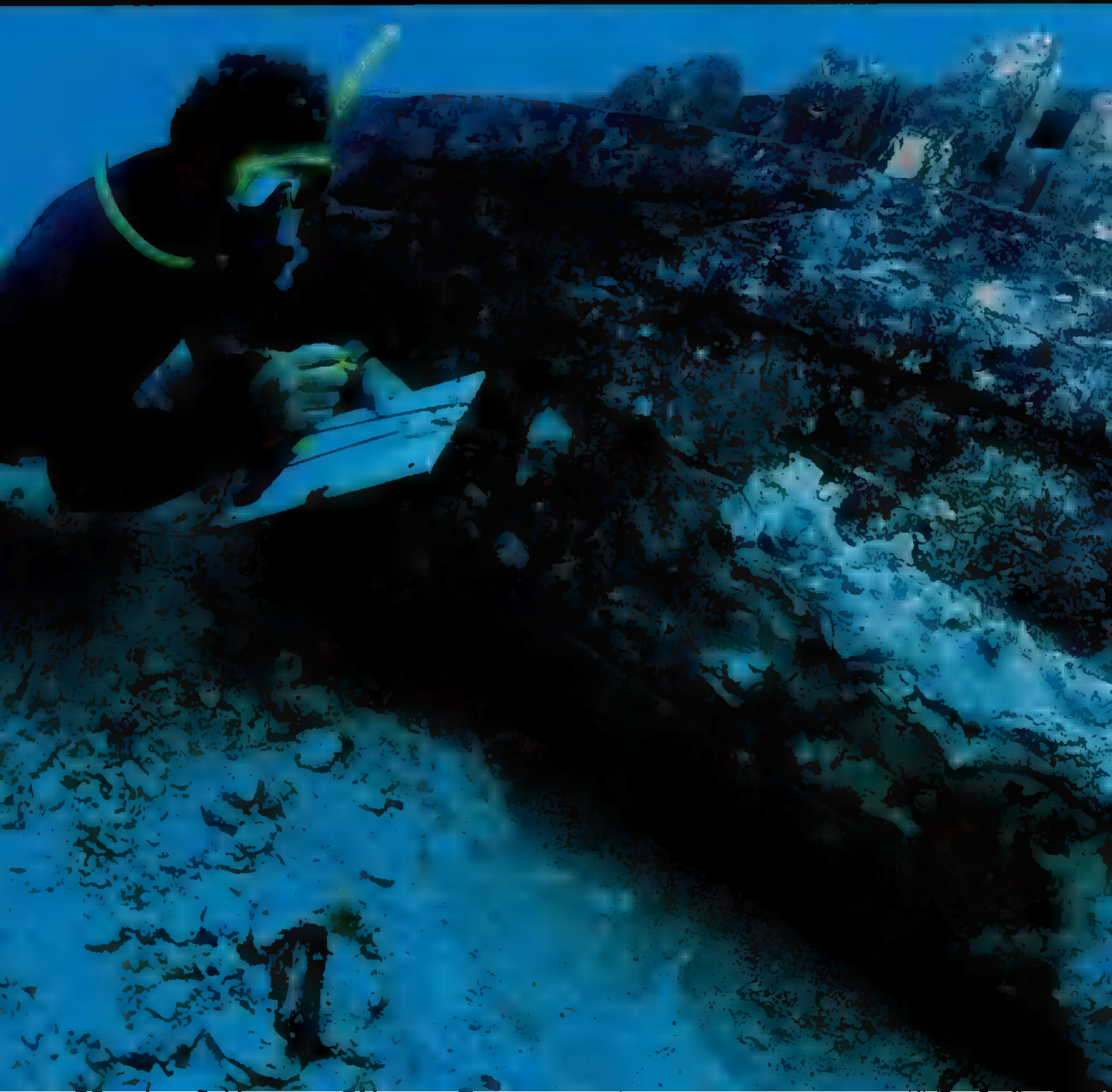
boiled up two meals a day for the masses of slaves. Raised in 1972 by treasure hunters, the cauldron is now in the hands of collectors. It is now on display at Florida's Mel Fisher Maritime Museum.



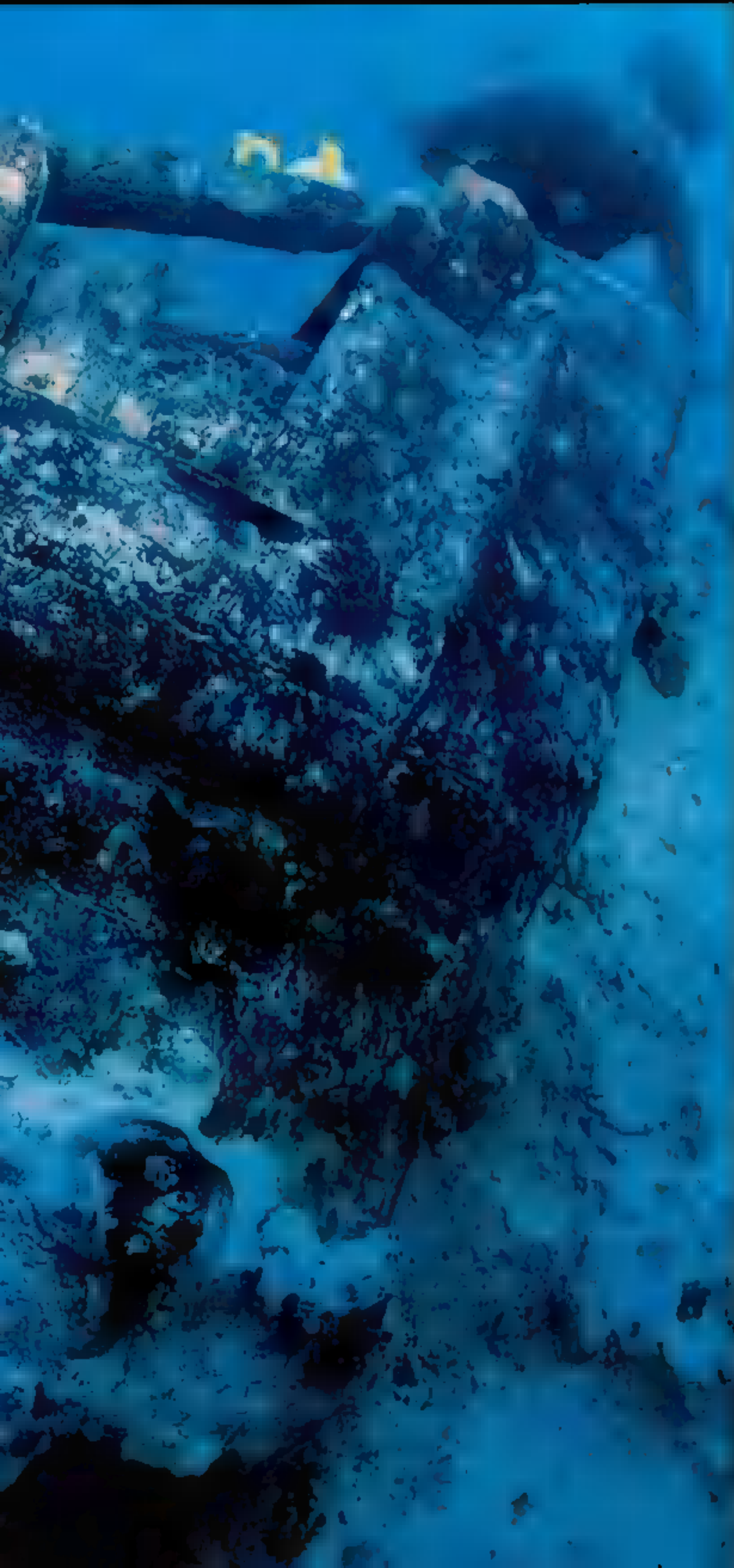
© DON KINGAID (TOP)

Tools of the Trade

Centuries encrust an African elephant tusk (bottom right, with Moore) that was used with the iron tools to excavate the ship from the water, and thus its role in human commerce. The tusk is still in the water, a lab, where Malcom Moore and Moore use an all-terrain scribe to clean a metal tusk, a piece of rigging hardware. But Moore and Malcom Moore the more fragile stern and keel remains



(presented on page 58, below) it was the
the scientists have used to raise
Henrietta Marie's broken hull and
depths with the other artifacts
exhibited in Fisher's museum.
Until then Malcom works with
a series of images with a
to reveal the curva-
ture of the hull. What is
late is the staggering loss that
the wreck represents. "It's a powerful
experience to touch something he
actually sat on these timbers,
in chains, knowing their fate." □

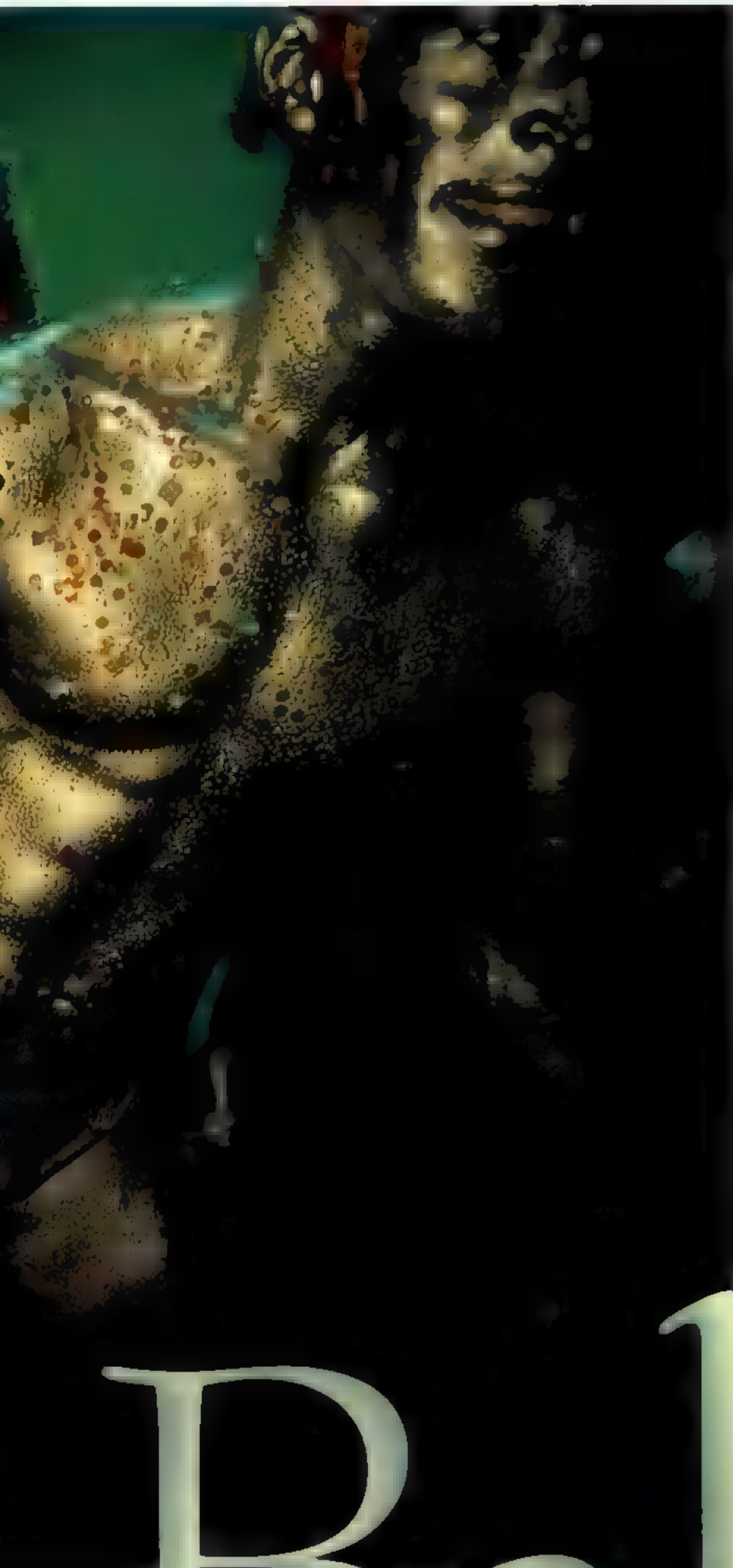


Hands On (our specialty)

See more artifacts from the
Henrietta Marie and link to
related resources at [national
geographic.com/ngm/0208](http://nationalgeographic.com/ngm/0208).



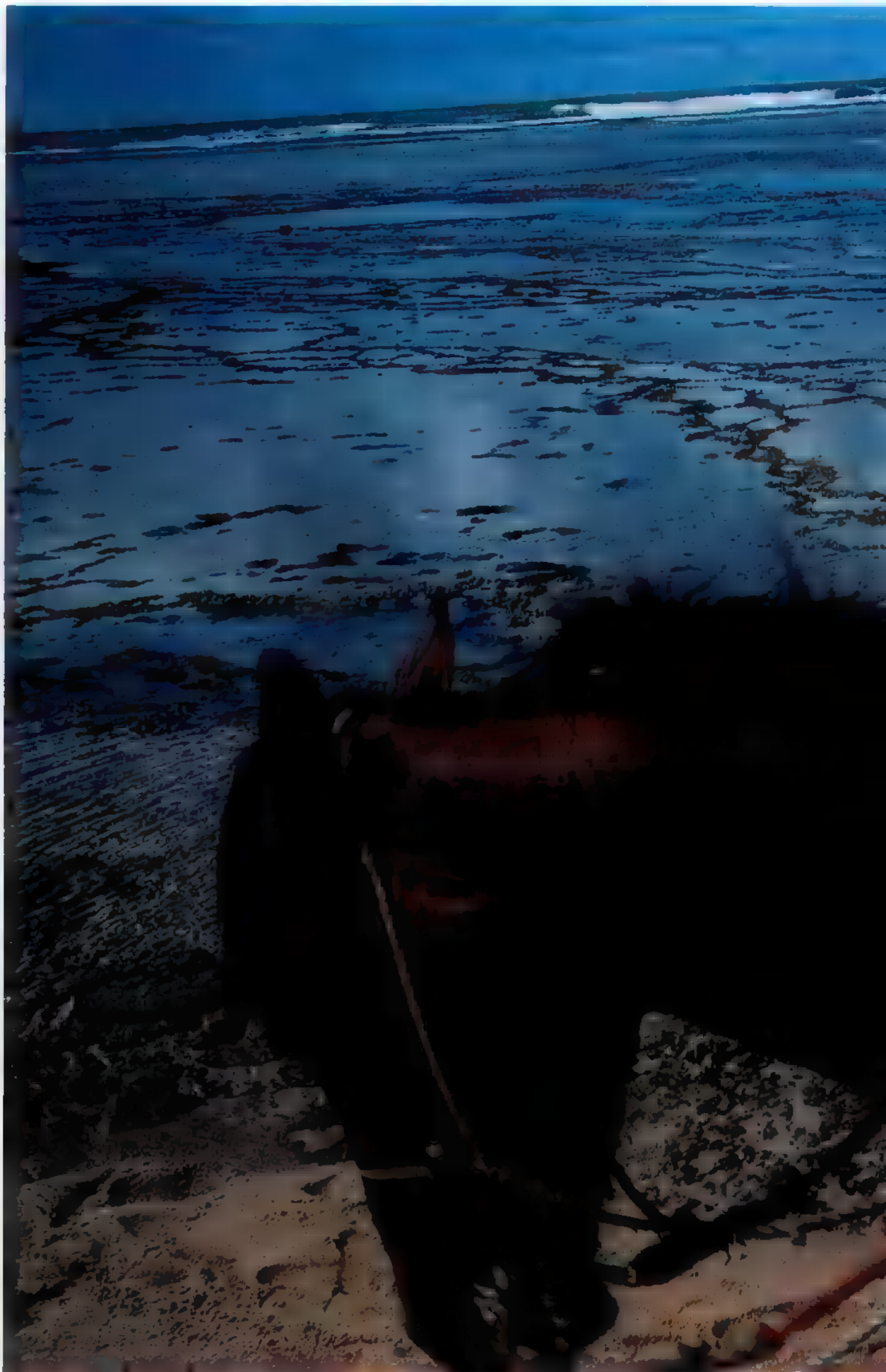
Where Brazil Was Born



Painted dancers boost the sizzle of Brazil's largest Carnival street parade as it snakes through Salvador, capital of Bahia—a Brazilian state that reverberates with African rhythms. As an African American, I had come to see what had sprouted in this place where Africa's seeds were first planted in Brazil centuries ago. I found a culture steeped in traditional religions brought by enslaved peoples from West Africa, a place that remains key to the identity of this sprawling state.

Bahia

By Charles E. Cobb, Jr. Photographs by David Alan Harvey



Ebb tide and azure skies *draw a sauntering rider and a svelte wader to Praia do Forte beach, northeast of Salvador, at the start of a highway known as the Green*



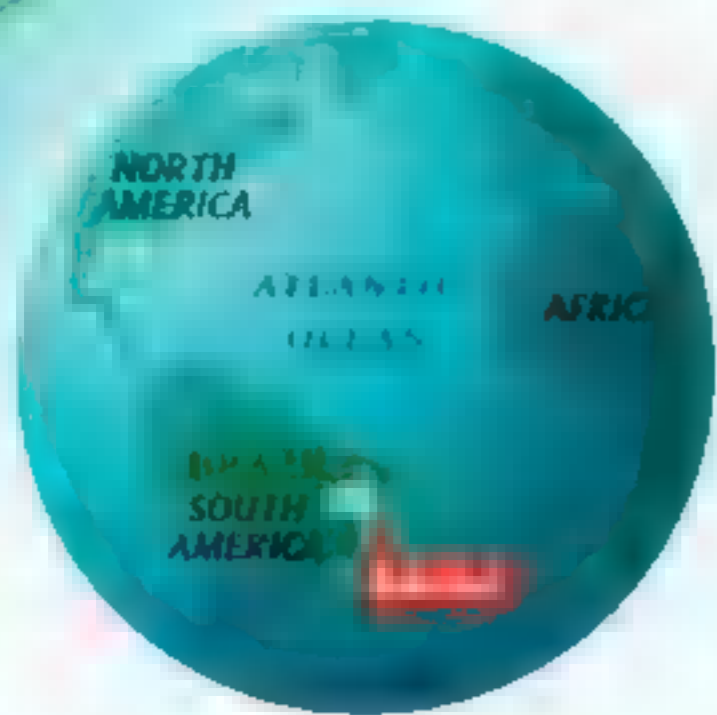
Line. Visitors are cautioned not to disturb a sea turtle sanctuary here. The Green Line stretches 180 miles along pristine beaches fronted by fishing shacks and the occasional hotel.



Twin palms frame Our Lady of Guadalupe Chapel, gleaming like a sugar cube on a sugarcane plantation and cattle ranch near Cachoeira. The 18th-century chapel reflects



a baroque style common in colonial Brazil. Descendants of slaves who once labored here now work on this 2,000-acre spread, and some own small parcels of land in the surrounding area.



The cradle of modern Brazilian civilization is the country's own fertile crescent, a broad band of dark, rich soil

called the Recôncavo that surrounds Baía de Todos os Santos, or All Saints Bay. In the early 16th century Portuguese settlers established plantations in this region, where slaves—at first Indian, then African—worked fields of sugarcane, coffee, and tobacco. The wealth they generated enriched Salvador, Brazil's first capital. By 1850 the city's port had received an estimated 3.5 million slaves, far more than the 430,000 sent to the United States during its slave-trading era. This hits me hard: My great-grandfather was born into slavery in Alabama. He founded a farming community in Mississippi called New Africa in 1888, the year that slavery was abolished in Brazil.

Today in Bahia, the most African of Brazilian states, blacks make up 80 percent of the population. Though slavery is long gone, hard labor persists for sugarcane workers like Francisco Brito Olindo (below), burning underbrush before cutting stalks of cane. He earns only about five dollars a day, with a bonus for higher production. Much of this dangerous work is still done by hand with machetes—and conditions can be spartan. Antonio Valdemir de Oliveira, shrouded by mosquito netting (right), sleeps on a concrete bunk.







A rosary sways with every pothole as a bus transports Bahian cane cutters to a plantation near Cachoeira. Using his own horsepower, Derival Santos Silva leaves his family (right) and heads out for his job running cattle and growing coconuts. Silva works for an absentee landlord, a common situation in Bahia. In colonial times huge tracts of land were granted to a few owners, a pattern that endures: In Brazil today 5 percent of the population owns 80 percent of the property. Land reform has become an intractable issue inflamed by deadly showdowns between squatters and landowners. Among the flash points are the backcountry communities called quilombos, founded by slaves who jumped ship in All Saints Bay or fled mines and plantations. In 1988 the government recognized the rights of quilombo residents to own land they and their ancestors had worked for centuries. But their hope of claiming that land is stymied by a lack of documentation—long ago Brazil destroyed most official slave records.

Beyond the humid and fertile coastal region of Bahia—a state nearly the size of Texas—lies a semiarid sweep of cattle country whose settlement was hastened by an 18th-century gold rush.





Piety and cruelty intertwine in Salvador's history. Members of a lay order congregate at Rosário dos Pretos Church, at right, in the now trendy Pelourinho district, named



for the pillory where slaves were whipped. A nearby museum celebrates the late Jorge Amado, whose novels brim with the saints and scoundrels who settled this captivating and unruly region.



In the embrace of their gods, followers of Candomblé are possessed by African deities called orixás at a ceremony in Salvador. The multifaceted god Omolú moves in grass-shrouded mystery, his legendary power to induce or cure illness greatly respected. Punctuated by chanting and the pounding of drums, the ritual resembled those I've seen in West Africa. I also detected echoes of those black churches in America where worshipers are seized by the Holy Spirit. Candomblé is rooted in central and West African beliefs that were influenced by Catholicism and South American Indian practices. Hoping for more worldly rewards, young men spar at a community center (right) in a Salvador favela, or shantytown. Their inspiration is hometown hero Acelino "Popó" Freitas, who in January won the super-featherweight world championship bout in Las Vegas. Youths also perform like street corner break-dancers as they practice capoeira, a martial art and dance that warrior slaves brought with them from central Africa.

Like voodoo in Haiti and Santería
in Cuba, Candomblé flowered in Bahia
from practices uprooted from Africa.
At one ceremony I was told that
some people present were actually the
ghosts of long-dead ancestors.





The pace of life *seems to follow a slow samba beat in Morro de São Paulo on the touristy island of Tinharé, popular with Argentines and other Latin Americans. Bahian*



tourism has also been boosted by increasing numbers of African-American visitors, drawn by a New World African culture that many find truer to its origins than their own.



Spirits rise as night falls on Salvador's lively Barra district. Elsewhere in the city a free spirit in the audience (right) rocks to the beat at *Noite Beleza Negra* (Festival of Black Beauty), sponsored by the music group *Ilê Aiyê*. But beneath the festive surface, somber themes linger in Bahia, a state hobbled by high illiteracy and a low standard of living. In a state seemingly unconcerned about race, I still found issues surrounding skin color. I was struck by the small percentage of black people in positions of political power in this overwhelmingly black state. Though blacks hold nearly half the 35 Salvador city council seats, they have been elected to only 3 of 63 positions in the state legislature—few enough to convince me and a growing Bahian black-consciousness movement that there are untold miles yet to be traveled before true equality is reached.

MORE ON OUR WEBSITE

Go to nationalgeographic.com/ngm/0208 to learn how African drumbeats influenced samba, a popular type of music in Bahia.

Everywhere I went, I heard the sound of samba, the high-spirited, indigenous music of Brazil whose rhythms are African through and through.

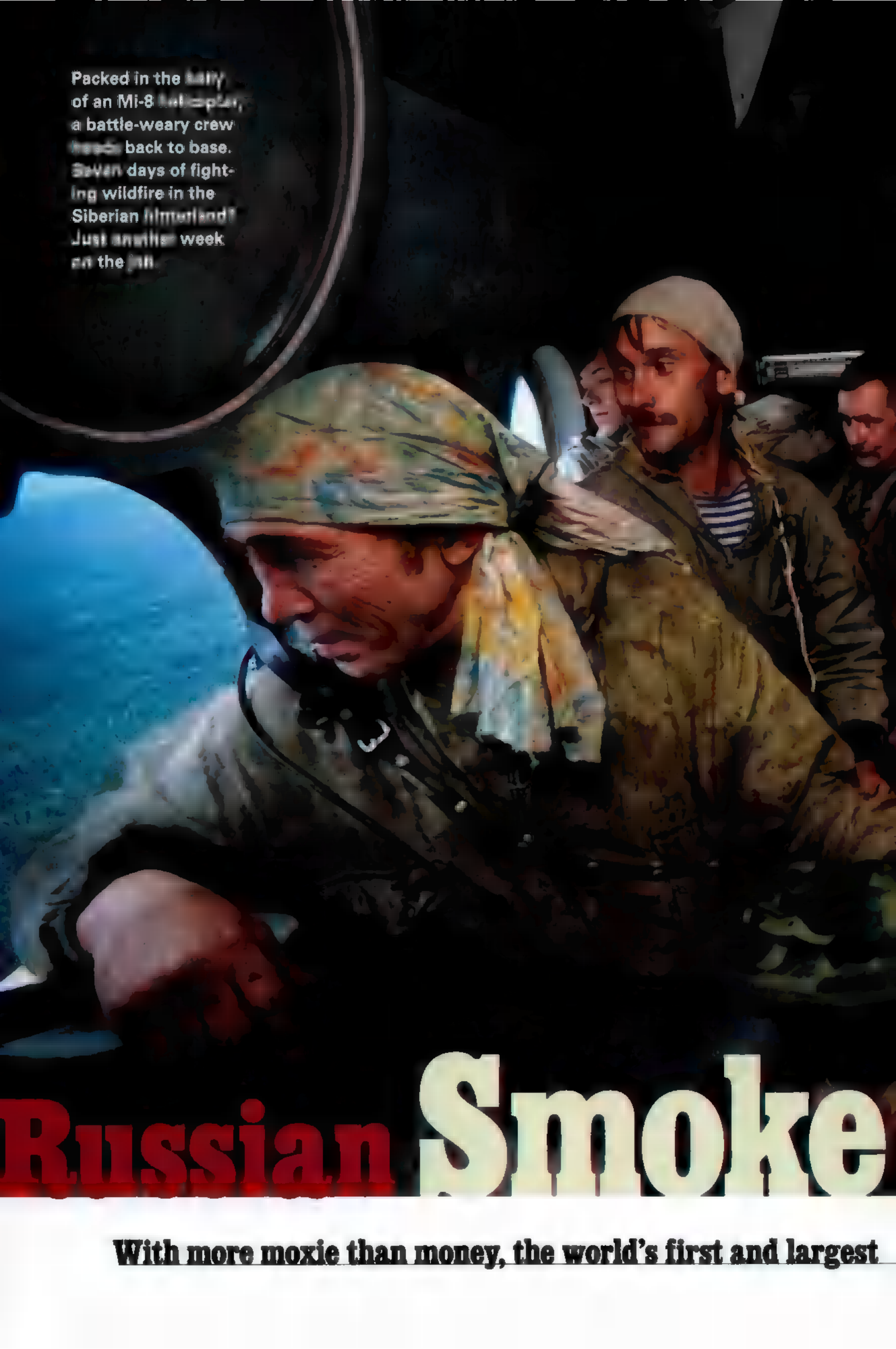




New Year's Eve revelers *drift like scattered confetti as flashes from nearby fireworks reflect in the tide. Wearing the traditional white of Candomblé, some carry*



offerings to Yemanjá, the much beloved deity of the sea. Bearing their hopes for the future, they move freely toward the ocean that carried their forebears to these shores in chains. □



Packed in the belly of an Mi-8 helicopter, a battle-weary crew heads back to base. Seven days of fighting wildfire in the Siberian hinterland? Just another week on the job.

Russian Smoke

With more moxie than money, the world's first and largest



jumpers

aerial firefighting force snuffs wildfires across 11 time zones.

BY GLENN HODGES

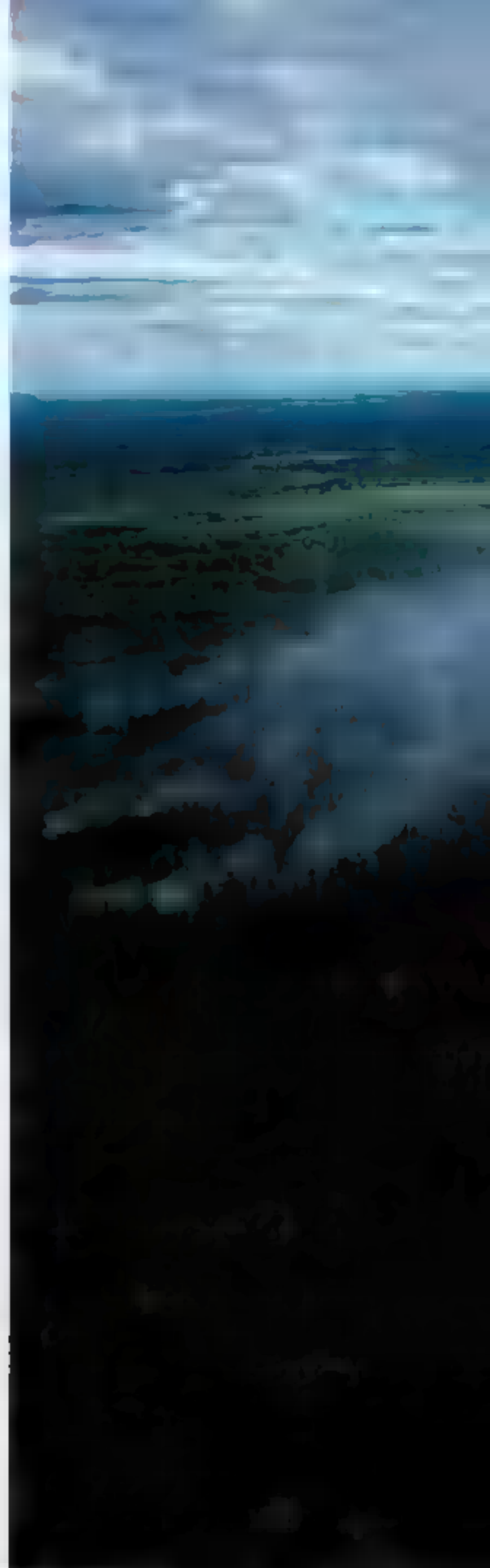
PHOTOGRAPHS BY MARK THIESSEN

BOTH NATIONAL GEOGRAPHIC STAFF

ALLEXANDER SELIN, the head of central Siberia's aerial firefighting force, is a man who knows how to make himself clear, even in English, a language he barely knows. The police, he tells us, are "garbage." Vodka is "gasoline." His driver? A "Russian barbarian." And caution . . . well, caution doesn't seem to be part of his vocabulary. Caution is for sissies and Americans. "No seat belts in Russia!" Alex barks as we speed away from a police checkpoint soon after our arrival in Krasnoyarsk, he and his driver unbuckling their belts in defiant unison.

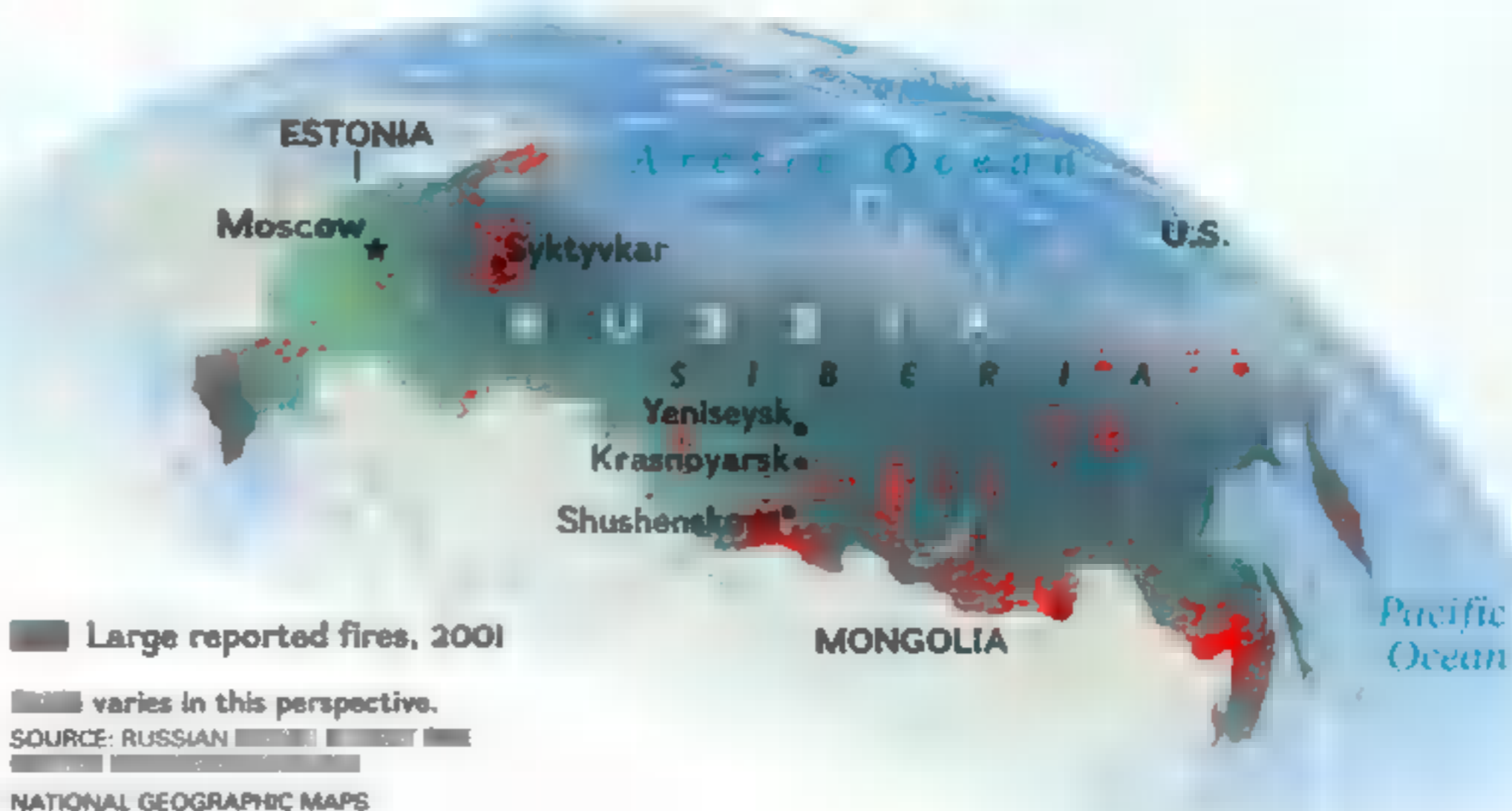
After a few days in his care we will come to call Alex, simply, Big Boss. A thick-fingered, barrel-chested Siberian who hurls his words like shot-put balls, Alex rules a fiefdom the size of Texas with an army not much bigger than the Texas A&M marching band. His 500 smokejumpers, firefighters who jump from planes and rappel from helicopters, cover a swath of boreal forest that stretches from Arctic tundra to the Mongolian border.

Photographer Mark Thiessen and I have come to Siberia to see Alex's men in action, but by the time we're halfway from Krasnoyarsk to Shushenskoye, 200 miles to the south, I'm not sure we'll live long enough to see a single fire. We're throttling through the mountains in a pair of fume-filled Volgas, taking curves at 90 miles an hour, passing blind on hillcrests, narrowly avoiding one head-on collision after another—and I'm thinking wistfully back to our training in British Columbia, where Mark and I rappelled out of helicopters feeling as safe as the day we were born. Finally the lead car in our little caravan sideswipes a truck. We pull over to check the damage—a dented quarter



FIRE ARMS RUSSIA

Holding a fourth of the world's forest, Russia faces a daunting number of wildfires—between 20,000 and 35,000 each year. Fires may burn undetected and unchallenged in the most remote areas, but the country's 4,000 smokejumpers put out thousands that no one else can reach.





panel—but the collective response is a shrug and a return to the road, full speed ahead.

So I'm not surprised the next morning when we board our first Mi-8, an 18-wheeler of a helicopter that is Russia's aerial firefighting workhorse, and there are no seat belts in sight—and practically no seats. Alex has taken our visit as an opportunity to host a half dozen cronies on a weekend fishing trip in the mountains, and when we land in a field to pick them up, gear gets piled willy-nilly between the two huge fuel tanks—a rubber boat here, an outboard motor there—and everyone plops down on whatever looks most comfortable.

That afternoon, over vodka shots at the fishing camp, Alex explains the Russian way of doing things. He's been to California and Idaho to see how American firefighters work, and when he thinks of riding in their helicopters—all strapped in by seat belts and regulations—he laughs at the memory. "No move, no speak!" he says. You can't size up a fire if you can't move around and look at it! You can't make a plan if everyone has to be quiet!

"And they call Russians crazy!" the pilot cuts in.

Having barely survived their driving, I'd say "crazy" seems about right, but you've got to be at least a little crazy to jump from a plane into a fire, and the Russians have been doing it longer than anybody.

"The idea of actually parachuting into fires was a Soviet invention," I am later told by Stephen Pyne, an American wildfire historian who is one of the few people outside Russia who know much about Avialesookhrana,

Meet the enemy:
■ **smallish fire creeping through the boreal forest understory. Most fires in Russia look more or less like this, but in the right conditions they can swell into conflagrations. The best way to keep the lid on is to catch fires when they're small.**



Russia's aerial firefighting organization. "In the 1930s these guys would climb out onto the wing of a plane, jump off, land in the nearest village, and rally the villagers to go fight the fire."

Last year Avialesookhrana celebrated the 70th anniversary of its first flight. (It would have been the 75th anniversary, but when the first plane took off from Leningrad in 1926 to look for fires, the pilot made a beeline for Estonia and defected.) Once they got going, the Soviets quickly built a program that remains to this day the largest in the world—despite a decade of post-Soviet budget cuts that have halved the ranks, from 8,000 firefighters to 4,000.

It's a shoestring operation—just \$32 million a year to cover 11 time zones, less than the United States might spend in a few days of a heavy wildfire season. But with their mismatched uniforms and 50-year-old biplanes, Russian smokejumpers do what their countrymen do so well:



make do with less. Less money, less equipment, and yes, less caution—even with fire.

When we break camp the next day to return to Shushenskoye, I'm surprised to see that the campfire is left smoldering. It's a hot July day, which would be bad enough without the helicopter's rotor wash blowing everything all over the place, but the risk doesn't even seem to register with Alex, central Siberia's most powerful firefighting official. In the U.S., firefighters would douse a fire on an ice floe in the dead of winter, especially with journalists around. But here they play the odds the way they see them, and perfect safety is burdensome and unnecessary. Fire shelters and fireproof clothing? Too expensive, but that's OK, because the odds of needing them are low. Seat belts? Impractical. Thousands of times you will buckle and unbuckle, and probably for nothing. Campfire? It's not going anywhere.

As many as 20 firefighters can rappel to a fire from a turbo-powered Mi-8 helicopter, but the Russians haven't forgotten their roots. They also parachute from decades-old biplanes, much as they did when they pioneered smoke-jumping in the 1930s.



Where there's a fire, there's a smoke. Asked whether he would rather run out of food or tobacco, a smokejumper says, "You can catch fish in the river, but cigarettes?" The men don't worry much about getting short-winded—most fires move slower than they do. When flames crown into tree-tops, it's usually a brief show.

NOT SURPRISINGLY, people cause two-thirds of Russia's 20,000 to 35,000 annual wildfires—and by the time we've been in Siberia for a week, I find myself wishing they'd cause a few more. The Shushenskoye area is hot and dry but fireless, and after seemingly endless rounds of vodka-steeped hospitality we finally persuade Alex to send us north to Yeniseysk, where we hear fires are burning across the region.

When we get to the base in the town of Yeniseysk two nights later with our guides, firefighters Valeriy Korotkov and Vladimir Drobakhin,

we're eager to finally get to a fire, and the gods respond accordingly: In the morning it is raining. Pouring. I look at Valeriy. "I thought you said Friday the 13th was your lucky day."

"Ahh, the day is not over, my friend."

Valeriy is one of those guys with so much heart that you believe in his luck. A smokejumper the past 25 of his 45 years, he smokes constantly (filtered cigarettes, "because I care about my health") and drinks lustily, but he never seems to lose the bounce in his step and rarely complains—even when he loses the last of his upper front teeth, which we suspect happened sometime during our month together. With a wavy shock of hair, salt-and-pepper goatee, and a suit of camouflage pasted onto his body by days of sweat, he exudes an intensity that seems a bit out of place when we find ourselves in civilization, like some sort of deep-cover soldier back from the front lines.

Midday the word comes: Hurry and get your stuff together, we're going to a fire. I'm just this side of incredulous, given that we've been soaked in by rain for 12 hours, but a two-hour helicopter ride later, we land at the edge of a smoldering patch of forest and the sun is shining. Valeriy's lucky day! He and Vladimir quickly chop down some birch saplings to make poles for our canvas tent, and we hike what looks like an old logging road through a blackened forest to the fire line.

Twelve smokejumpers have been on this 120-acre fire for nearly a week. It seems all but dead on this flank, but the guys chop a few saplings to make handles for their rakes and shovel blades and get to work, scraping clean a foot-wide swath of forest floor, then lighting a backfire with pine needles and birch bark. The backfire burns toward the wildfire, consumes its fuel, and stops it in its tracks—the basic technique of wildfire fighting everywhere, whether done with shovels and pine needles or bulldozers and drip torches.

Each summer Avialesookhrana's firefighters face the Herculean task of containing fires across two billion acres of the largest coniferous forest in the world. Though regional forestry offices help fight fires in more populated areas, smokejumpers—housed in 340 bases across the country—are the sole defense for half of Russia's territory, flying to fires in crews of five or six when parachuting from An-2 biplanes and in groups of up to 20 when rappelling from the Mi-8 helicopters.

"We face danger three times: one when we fly on plane; two when we jump; three when we go to fire," Valeriy says, and the statistics bear him out. In the past three decades 40 Avialesookhrana firefighters have died on the job—24 while fighting fires, 11 while parachuting, four in aircraft





A stick in time: After quickly turning a sapling into a shovel handle, one firefighter attacks with sand while another beats the flame with birch branches. If smokejumpers kill a fire quickly, it adds a bonus to their monthly hundred-dollar pay.

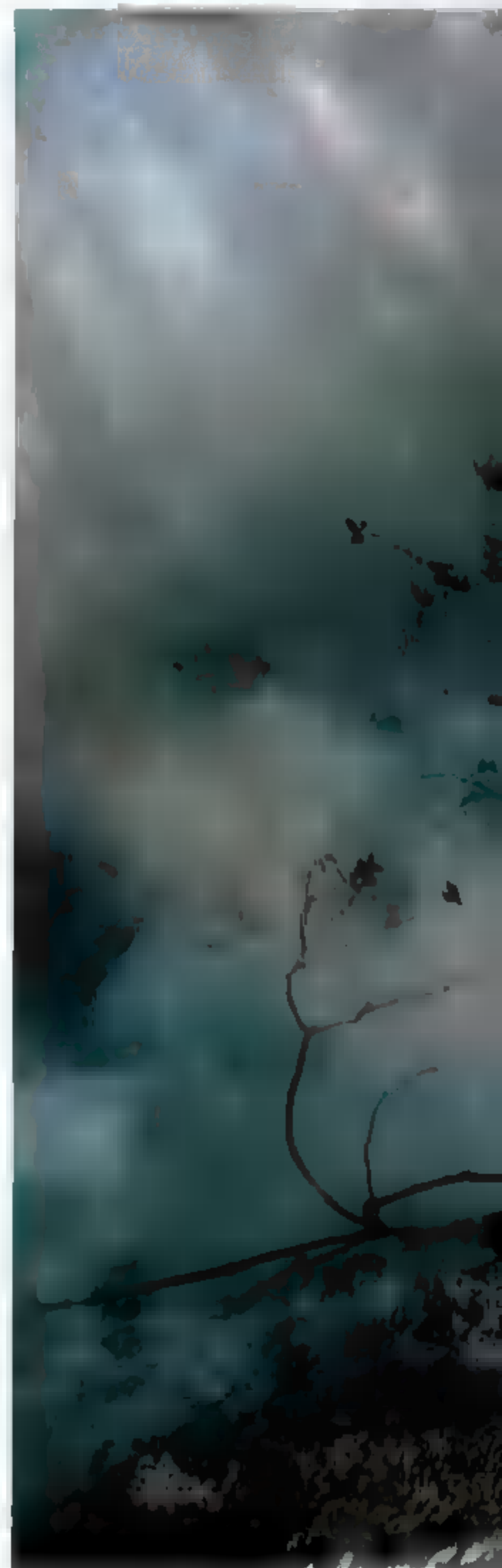
after making a couple hundred feet of fire line the guys break for a smoke. Everyone smokes unfiltered Primas—loosely rolled butts that cost about a nickel a pack and make health-conscious chain-smokers like Valeriy shudder. As we swap Russian and English swear words and laugh, Alexi Tishin, an earnest 28-year-old with a week of stubble and a smattering of gold teeth, says, “This is the best job for tough guys”—you get to jump out of planes, fight fires, live in the forest. He says he especially loves jumping to small fires and trying to put them out fast. If they kill the fire in a day or two, they get a few extra dollars each—no small sum, given that smokejumpers earn on average 3,100 rubles, about a hundred dollars, a month. The incentive seems to work: More than half of all fires are put out within two days.

THE SMOKEJUMPERS are true woodsmen—hunting, fishing, and trapping sable in the off-season to make ends meet, as nimble with an ax and knife as they are with their hands. When they land at a fire and make camp, they don’t just make tent poles and shovel handles from saplings, they make tables, benches, shelves—you name it. I’m amazed to see one guy make a watertight mug out of birch bark.

It’s a good thing their outdoor skills are solid, because their equipment often isn’t. When we return from the fire line, Valeriy discovers that one of his brand-new experimental smokejumper boots has melted. The rubber sole is a mash of black goo. His boots lasted “an hour, at best” he says angrily, before launching into a torrent of complaint about poor Russian equipment. “This tent like from Second World War,” he says, pointing at the canvas tent that will welcome mosquitoes and rain into our lives for days to come. The tents have no mosquito netting, the chain saws are heavy and unwieldy, the backpacks have no waist straps, the pull-on boots are made of cheap synthetic leather (and feet must be wrapped in towels to make them fit), the clothing is neither fire retardant nor water resistant. And everything is heavy.

accidents, and one by lightning. Valeriy and Vladimir both tell me stories of parachuting fatalities, one when a jumper landed in water and drowned, another when a jumper hit an electric line. But jumping is the thrill that gets them hooked. “Two minutes fly like eagle, three days dig like mole,” Valeriy says of the smokejumper’s life—and the flying’s worth the digging.

The day is late, so



Jumping is the thrill that gets them hooked. “Two minutes fly like eagle, three days dig like mole,” Valeriy says of the smokejumper’s life.



For most of these guys that's just the way it is, but Valeriy and Vladimir are among the 120 Russian firefighters and managers who have been to the United States through an exchange program that began in 1993 between Avialesookhrana and the U.S. Forest Service. American and Russian exchangers alike are struck by the Americans' superior equipment and the Russians' inimitable resourcefulness.

Vladimir, who fills his American fireproof clothing with the stocky build of a linebacker, came home from a summer in the States with boots and tools and a wad of cash that was many times his annual pay, but he also returned with a new appreciation of his Russian brothers. "Put us in the woods with matches and a fishing rod, and we can live," Vladimir says. "We know how to eat mushrooms, catch fish, make a snare for animals. But for American firefighters, it would be a very bad situation."



With budgets tight and boots loose, rags stand in for socks and saplings double as tent poles. “Ten years ago we had more guys, but the equipment was bad,” says one veteran smoke-jumper. “Now we have fewer guys, and the equipment is still bad!”

Valeriy tells me how one time his squad’s food was lost when it landed in the middle of a lake. They didn’t have fishing gear, so he made a fish-hook from a piece of metal on his reserve chute, pulled string from his parachute bag, cut a birch branch, and—voilà—they had fish.

By morning the rain we escaped in Yeniseysk has caught up with us, and we huddle under a tarp as we listen to the daily radio dispatch. A group of firefighters is stuck in the forest 200 miles to the northwest. There’s no fuel to either fly them out or fly food in, so the dispatcher suggests that they build a raft and float down the river. No, they say, there’s no good wood here for a raft. Then you’ll have to walk, they’re told—12 to 15 miles out, with all their heavy gear. You can almost hear the groans.

Fuel—or the lack of it—is a perennial problem for Avialesookhrana, even more the firefighter’s bane than lousy equipment. Because we have a short time to see firefighters at work, Mark and I have been getting special treatment with helicopter transportation. But at the next fire, our luck runs out, and we get a taste of what smokejumpers have to put up with.

The first night there we’re drenched by the same weather system we’ve been fleeing since we got to the Yeniseysk region. After two nights and a day of rain, the sky clears, and we brave the mosquito hordes to dry our stuff and wait in vain for the helicopter. The day after that, still no helicopter. We’re later told that someone back at the base forgot to fill out the correct paperwork—and the camp’s radio battery has died, so we can’t even call in a reminder.

“Every time we have same problem,” Valeriy says. “After rain, they think, ‘Guys sit in forest? It’s OK.’” Once he had to wait 15 days for a pickup.

When the helicopter finally comes, we’ve been in Siberia for nearly three weeks, we’ve seen a grand total of 45 minutes of very sleepy fire, and we’re told that it snowed two inches in Yeniseysk that morning. It’s the middle of July, and it has been the wettest fire season here in 15

With their mismatched uniforms and 50-year-old biplanes, Russian smokejumpers do what their countrymen do so well: make do with less.



years. We decide to leave for Vladimir's region in northwest Russia, where it's hot and dry and fires are breaking out all over the place.

VLADIMIR'S BASE in Syktyvkar, a city of 226,000 roughly 600 miles northeast of Moscow, is much like the one in Yeniseysk—a central building with offices and training facilities, plus a dormitory where the smokejumpers live during fire season, from late spring to early fall. The forest in this region is much more populated than what we've seen in Siberia, spotted with clear-cut logging operations that make it easier for local foresters to get to fires with bulldozers and local manpower.

As we fly over the checkered terrain in an Mi-8, we pass a number of smoke plumes before landing near a square-mile fire that horseshoes around a boggy meadow. A crew of five smokejumpers is already camped in the middle of the meadow, and less than a mile away local forestry folks are cutting line in the forest with bulldozers. Shortly after we land, an An-2 biplane circles the fire and drops a hand-drawn map into our camp, and we hike west through the woods to stop one edge of the fire.

The fire is a slowly moving wall of flame a foot or two high, occasionally crowning into brush and treetops in quick whooshes of flame. The guys light a backfire with pieces of birch bark, and as the backfire burns forward to meet the fire, they extinguish its back edge with devices called "piss pumps"—shoulder-strapped rubber bladders that



Sunlit smoke whispers the firefighter's secret: Life can be beautiful even when the world burns down around you. As fire crackles through a forest's understory, clearing brush and



preparing the ground for new life, it's hard for even a sworn adversary not to respect its role in the ecosystem. "Fires are natural," one smokejumper says, "but it's our job to fight them."



Fast food, smoke-jumper style: Pull it from the river and eat. Raw or cooked, fish is a welcome addition to starchy rations of potatoes and noodles. When downtime comes and cards are dealt, the insults that fly are even stronger than the tea.

spray water through a nozzle. The backfire itself isn't even necessary after a point, and they take to knocking down the flames of the wildfire with spruce boughs, Vladimir leading the way. I catch the bug and see how much of the fire I can contain just by stomping on it with my boots. I take out a good 30 feet in a few minutes, and it's surprisingly satisfying. I have changed the course of nature.

Valeriy smiles at me and nods. Now I understand his job. "This is the best!" he says. "We work in this forest not for money. We work for our happiness. Not like people in Moscow."

The next day's firefighting isn't quite so much fun. When we return to the fire line in the morning, a dozer has savaged the forest floor, cutting the soil down to its sandy base in a 12-foot swath of toppled trees. We spend the rest of the day following the dozers as they knock down 80-foot trees and leave two-foot-deep trenches in their wake. As the smokejumper crew and a host of locals set a backfire from the dozer trench, the six-foot flames from the downed trees and brush are so much bigger than the foot-high wildfire that three times in the course of the afternoon a helicopter will mistakenly drop water on the backfire instead of the wildfire. "Overkill?" I ask Vladimir. He nods.

This type of firefighting is unusual for Avialesookhrana. Smokejumpers are initial attack firefighters. They jump on new fires in remote places and put them out as fast as they can. This—with the bulldozers, the inexperienced locals, the water drops—is more like a circus.

After seeing how much more damage the bulldozer did to the forest than the fire itself would have done, I ask Vladimir whether he thinks all fires need to be fought, or if some should be allowed to take their natural course. "Fires are natural, but bosses don't understand about letting fires burn," Vladimir says. He screws his face to one side and puffs out his chest like he always does when he imitates bosses. "They say, 'Every fire we have to put out, because it's dangerous.'"

In truth, they don't put out every fire, but that's only because they can't. In Siberia's remote expanses, where fire control would be prohibitively expensive, fires are allowed to burn. "Not being able to reach all these fires is probably for the good," says wildfire expert Stephen Pyne. "Fire is very much a part of the boreal ecosystem."

Fire has also been historically integral to human settlement in the Russian taiga. Hunters, trappers, foragers, and farmers all used fire to create habitable zones in the dense woods. Under communism, however,



“Put us in the woods with matches and a fishing rod, and we can live,” Vladimir says. “But for American firefighters, it would be a very bad situation.”



fire—whether of natural or man-made causes—came to represent an untamed threat to centralized control. “In the Stalin era, one was not allowed to waste resources,” Pyne says. “There was a real sense that letting fires go was deviant, slacker, anti-Soviet behavior. So to suggest that maybe the thing to do is stand back goes against a lot of cultural and political habits that are very hard to break.”

It also wouldn't be in Avialesookhrana's best interest. Already hamstrung by budget cuts, it's an organization that needs to prove its worth to survive, and firefighting heroics—not nuanced discussions of forest health and controlled burns—have so far been the best way to do that. In 1972, when wildfires of millennial proportions closed in on Moscow, 1,100 Siberian smokejumpers flew in to save the day. As Pyne writes in his book *Vestal Fire*, “Avialesookhrana glowed with pride. The periphery had literally saved the center. A grateful (and frightened) center replied

With helicopter fuel scarce in the post-Soviet economy, firefighters who get left behind when the job is done may have to wait days for a ride out. But even after budget cuts have halved their ranks, an uncertain future doesn't scare men who drop from the sky to do battle with fire.

with a major investment of rubles." Similarly, severe fires around Moscow in 1992 reminded government budget cutters of Avialesookhrana's value as an essential defender of Mother Russia.

WHEN WE FLY TO OUR LAST FIRE, we're accompanied by Yevgheny Shuktomov, the deputy chief of science and technology from Avialesookhrana headquarters near Moscow. Wearing American firefighting clothes from his exchange stint, he has brought three backpack firefighting units that use compressed air to shoot foam through a gunlike nozzle. Though they're designed for city firefighting, the minister of the department that oversees Avialesookhrana has bought five of them—at a staggering five grand a pop—to see how they work on wildfires. Yevgheny is here to test them.

When we land, the smokejumpers immediately set camp and go after the fire. It's the same kind of low-level ground fire we've seen before, and they beat it down with spruce boughs and dig sand from the ground to contain its edge. They work fast, breaking a heavy sweat in the cool evening, and stop only when they're told to save some fire line for the three guys with the special equipment. As a light rain begins to fall, Yevgheny and his crew come marching down the line, wielding their nozzles like commandos. It looks impressive, but they spray embers all over the place and the compressed air lasts only 45 seconds—so there's a lot of walking back and forth to the air compressor to reload. Valeriy, who has been assigned to photograph the affair, shakes his head. "Big bosses, like Arnold Schwarzenegger," he says, making a machine gun motion. "This only for picture. Piss pump and shovel—this is all you need."

The next morning, the only stretch of fire line that didn't hold was the part attacked with the spray guns; there the fire reignited and crept forward in spots until stopped by the rain. Turns out the shovels and sand worked much better. Back at our boggy camp, Yevgheny admits that the special units aren't very practical—too expensive and time-consuming. They'll keep them though. "Good for showing at some exhibitions," he says, smiling, and I'm reminded of Avialesookhrana's brochures and website photos, which show brightly uniformed firefighters with similarly improbable equipment.

"You need to go to America speaking English like that," one of the smokejumpers yells out to razz Yevgheny, and the guys around the fire laugh. They're playing a card game called "goat," an insult that'll get you killed in prison, I'm told, and they play it with vigor, slamming down their cards with each play. When he wins a game, Sergei Mykhyn, the tough, sinewy squad boss, makes profane pumping motions and calls his defeated opponent "milk brother," which I assume is somewhere just short of "goat."

Shirtless and tattooed, with fierce eyes and a cigarette-scorched voice, Sergei isn't the kind of guy who gets chosen to go to America. He's just too much Russian smokejumper. As we sit waiting for our ride out, the radio crackles to life, and it's bad news: The helicopter's rained in. Sergei looks over at us, the soft Americans and the soft bosses, with our fancy equipment and special treatment.

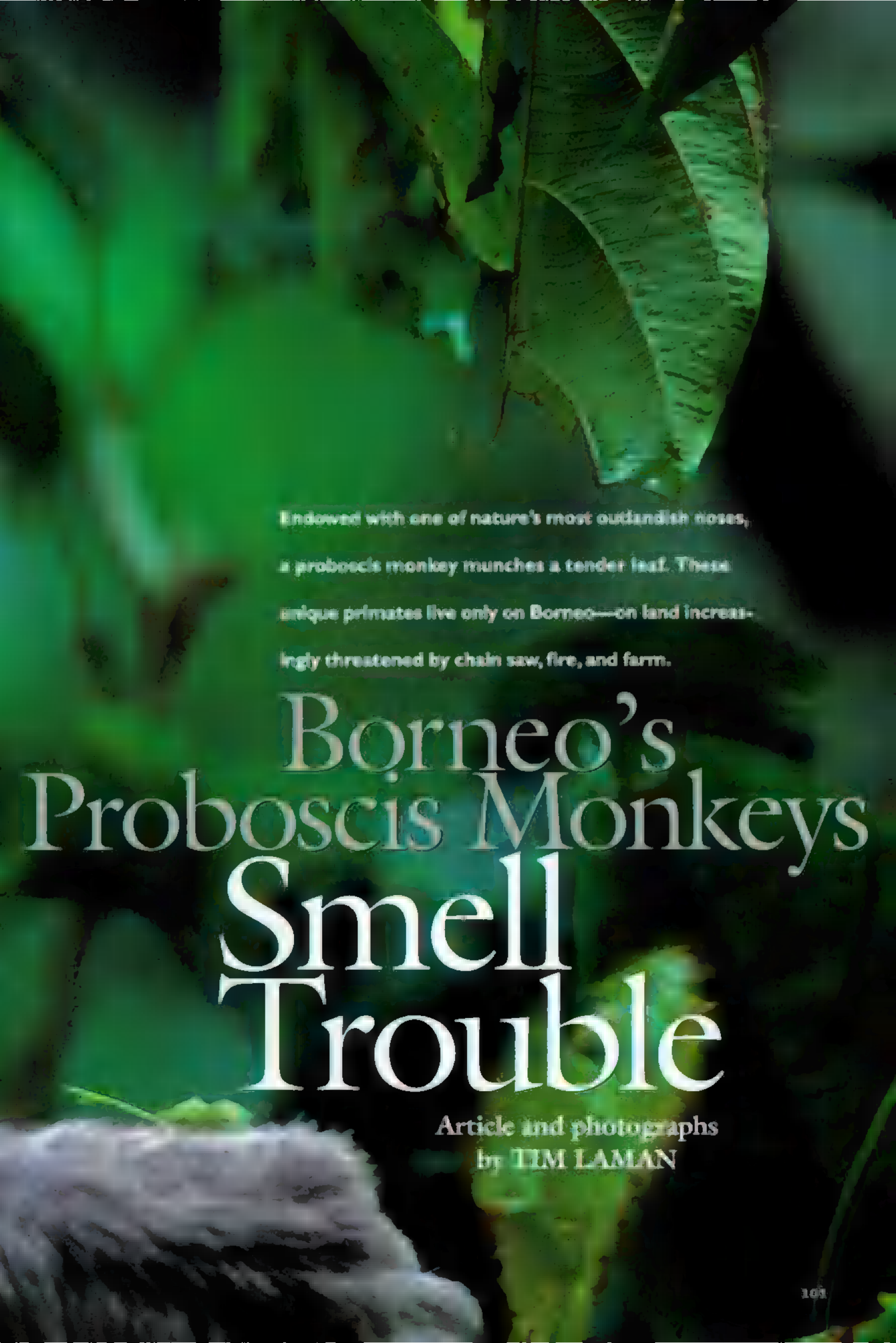
"Maybe you sleep in the swamp three more days," he says. Everybody laughs. We all know the truth—that the fireproof clothes, Gore-Tex raingear, and \$5,000 spray guns can't keep nature at bay any better than a tattooed Russian with a handmade shovel. □

MORE ON OUR WEBSITE

Drop in on a video interview with the author and photographer as they recount their time in Russia—on and off the fire line—at nationalgeographic.com/ngm/0208.







Endowed with one of nature's most outlandish noses, a proboscis monkey munches a tender leaf. These unique primates live only on Borneo—on land increasingly threatened by chain saw, fire, and farm.

Borneo's Proboscis Monkeys Smell Trouble

Article and photographs
by TIM LAMAN





Pushing off with powerful hind legs, a mother takes flight with her baby in tow. Living exclusively in the interiors of Borneo's river- and coastal forests and mangroves, proboscis monkeys leap from branch to branch in the hunt for leaves, seeds, and young lilies, their staple foods. Offspring go along for the ride until, at about a year old, they're ready to fly solo.



Grown to his full glory, a male proboscis monkey (left) sports a nose that reaches Pinocchio proportions. This is one of Asia's largest monkeys, with males reaching 50 pounds. Only males develop such huge noses, a likely result of sexual selection: Females may see nose size as a sign of a male's worth as a mate. The nose isn't the only oddity: Proboscis monkeys are excellent swimmers with partly webbed hands and feet to help them cross rivers, as when a flying leap falls short (right).





Known range of the proboscis monkey (*Nasalis larvatus*)
Protected



SOURCE: ED COLLIN,
THE GIBBON FOUNDATION
NATIONAL GEOGRAPHIC MAPS

The sinuous curves of Sarawak's Salak River (opposite) wind through coastal mangrove and swamp forests, prime proboscis monkey habitat. Nearby at Bako National Park, I sat in a blind and witnessed a rare sight: a proboscis monkey at eye level, crossing a patch of beach (below). Caught in mid-stride, this adult male displays the long-limbed grace of a primate well suited to life in the trees. The imposing tail is not used for gripping but may aid in balance as a monkey leaps aloft. Specialized plant-eaters, proboscis monkeys appear

permanently potbellied because of their huge chambered stomachs, which contain a bacterial soup that helps them digest seeds, leaves, and green fruits. They avoid sweet fruits, which could cause deadly bloating from rapid fermentation.

Proboscis monkeys need large tracts of forest to sustain their dwindling populations on Borneo. Recently declared endangered, fewer than 8,000 monkeys may remain, though surveys have been limited. Imperiled by settlement, agriculture, swamp drainage, mining, hunting, shrimp farming, and fire, these monkeys face odds longer than their noses.







Bravado, bluff, and truce

In full voice (and full nose) an adult male lets loose with thunderous honks and roars to threaten a potential rival. If the verbal assault fails to intimidate a foe, males will jump violently around, shaking the trees. Rarely do they come to blows.

Proboscis monkey social structure was a relative mystery until pioneering field studies in the past two decades by both Elizabeth Bennett and Carey Yeager showed that the monkeys are highly organized. The basic family unit, or harem group, has one adult male with several females and their offspring. Young males, who are kicked out of harems

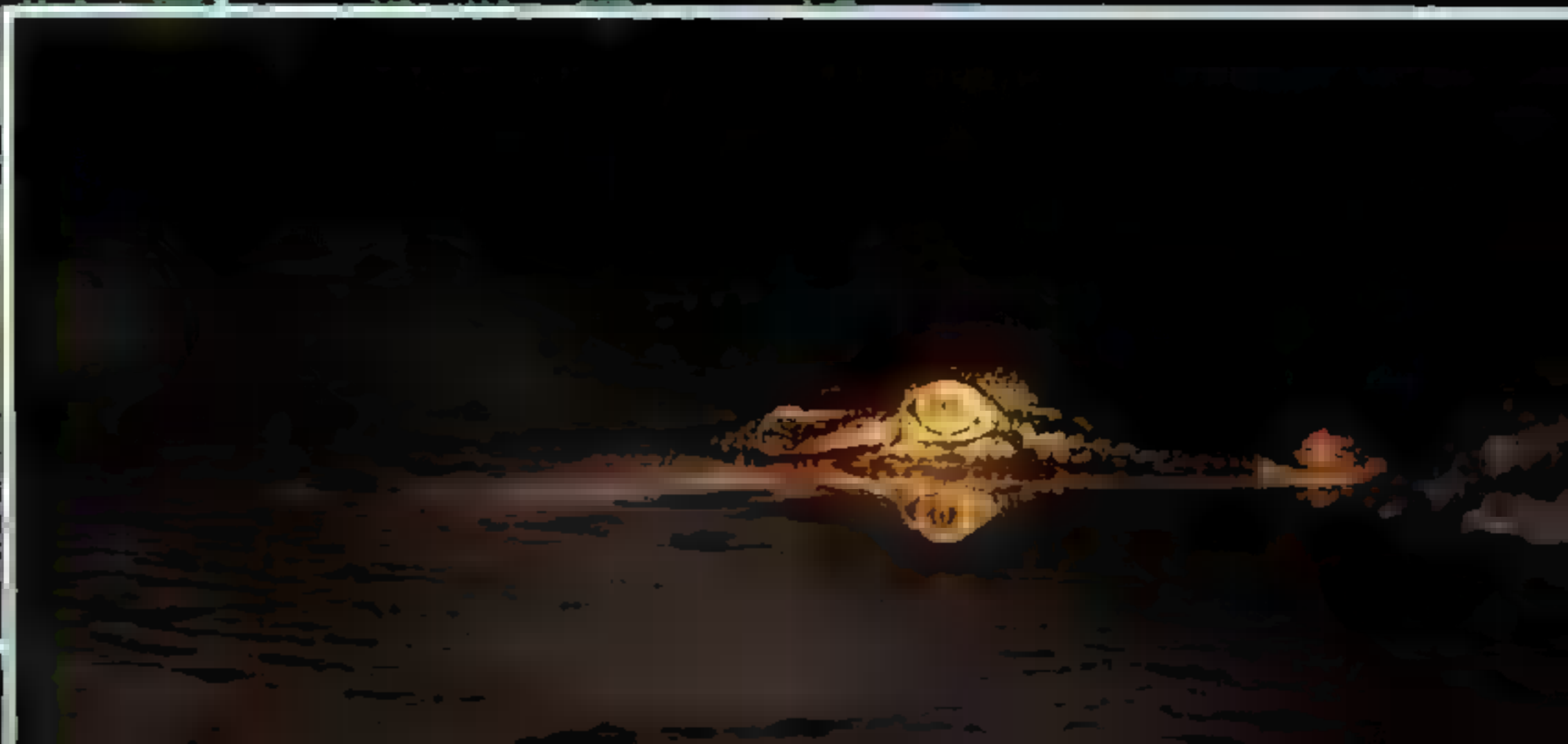
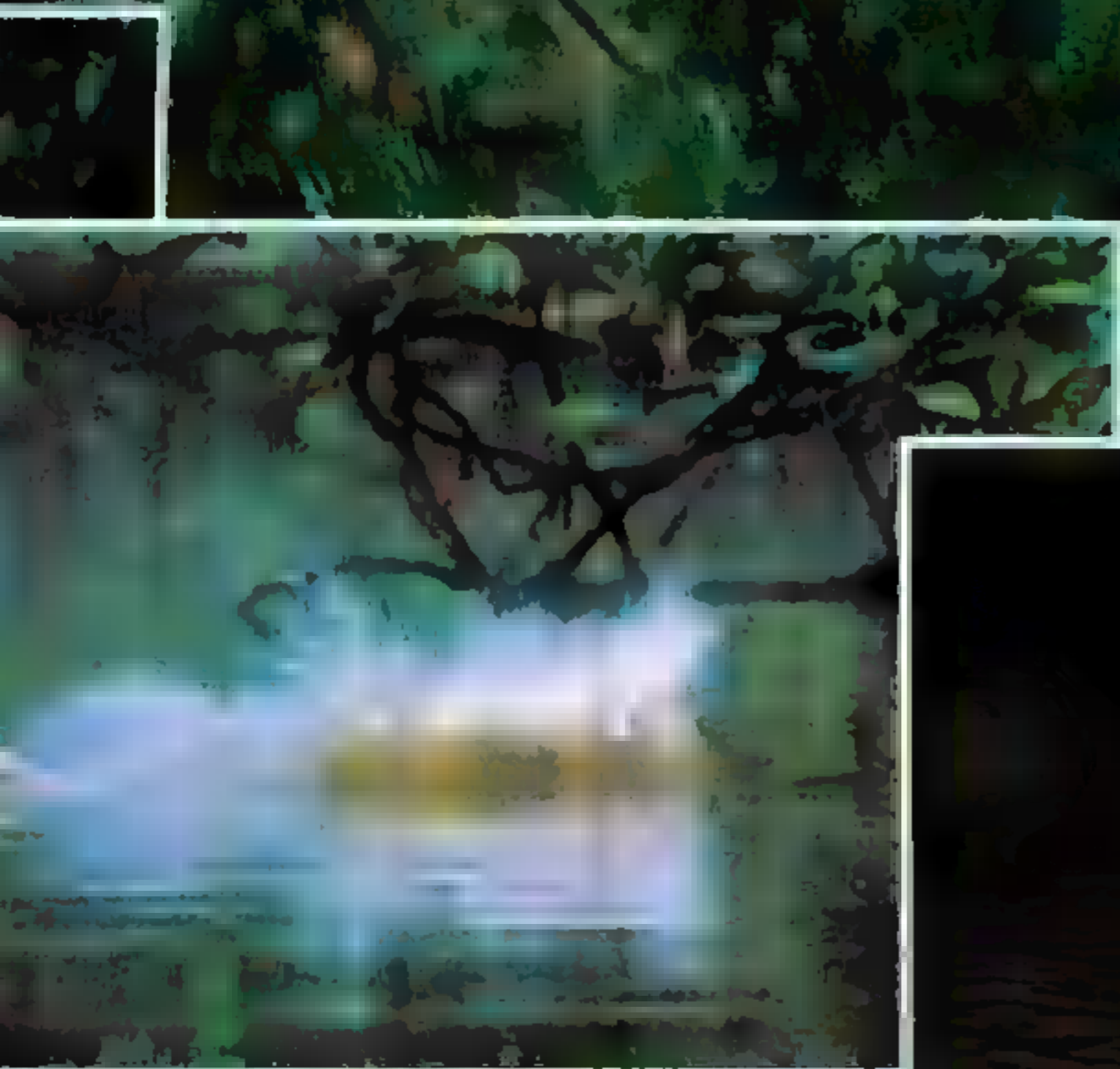
at an early age, form all-male groups where they bide their time until they reach maturity and form their own harems. Relations among females are usually peaceful, though squabbles do erupt. One evening I saw a female lean down and squawk at a mother and baby (right) who were encroaching on a choice sleeping spot.

After foraging, family groups gather in bands to sleep in trees at river's edge. This proximity of groups is unusual among monkeys, and the reason why they congregate by rivers at night is unclear. A treeless sweep of water may provide visibility for females scoping out potential mates.





So close, and yet so wet:
A proboscis mother with
babe attempts to leap
across a tributary of the
Kinabatangan River in
Sabah. Missing the shore,
she and her baby take a
dunk then swim the rest
of the way. To cross rivers,
groups of proboscis mon-
keys will climb as high as
30 feet in overhanging
trees, scan the river, and
leap as far as they can.
When they hit the water,
their staccato belly flops
are comical. Then they
swim, even underwater, to
quickly reach the bank.
Such caution and haste are
born of fear. Crocodiles
(below) appear to be the
monkeys' main predators.







Loving arms, helping hands

Bearing the dark fur and bluish face of infancy, a four-week-old baby rests with its mother in the relative peace of the Lower Kinabatangan Wildlife Sanctuary in Sabah. Though young babies stick pretty close to their mothers, proboscis monkey females share the job of infant care. Mothers may pass their infants off to another female or older sibling (above) from time to time.


Such help would be a must for a mother of twins (right).

Because twins are rare and seldom documented, I was thrilled to spot them from a boat on the river. I went back six months later and saw them again. Their survival seems a hopeful omen.



MORE ON OUR WEBSITE

Watch footage of Tim Laman cruising the rivers of Borneo in search of a close-up of proboscis monkeys at nationalgeographic.com/ngm/0208.



Scolding like a speed skater, a male proboscis monkey runs after his harem, which has left a mangrove feeding ground in Bako National Park, Borneo, often lead a group's movements, leaving males to play catch-up. The race is on to protect these fascinating and rare primates. As development expands, proboscis numbers continue to fall along with the trees that give them life. □



03246 The Girls of Summer

BY CATHY NEWMAN
NATIONAL GEOGRAPHIC WRITER

PHOTOGRAPHS BY PENNY DE LOS SANTOS

Among the after-lunch announcements at Camp Nokomis for girls was this news: There would be a dance that night at Camp Lawrence, the boys' camp on the opposite end of the island. Senior and junior girls were instructed to be at the dock at 5:15 for the 15-minute ride.

"Boys are normal creatures too. Try to be nice," suggested Debbie Parker, the camp director.

The seniors, of high school age, radiated excitement. The juniors, grades two to six, expressed doubt.

"Do they have fleas?" Kayla Szettella, a nine-year-old, wanted to know.



"I have two brothers, and I can tell you they do," vouched Meggie Lareau, her cabin mate.

"Do they bite?" asked another.

"If they do, that's your problem," deadpanned Debbie (although she is 67, she is "Debbie" to everyone, campers included).

For half a century, boys and girls have been attending summer camp on Bear Island, a Rorschach blot of wooded land three miles long, and at its widest point, three-quarters of a mile wide, at the northwestern end of Lake Winnepesaukee in New Hampshire.

In addition to the boys' and girls' camps, run by the Merrimack Valley YMCA of Massachusetts, the island is home to 184 privately owned cottages. Bear Island has no cars or roads, so travel is by boat or foot. The most exciting entertainment around is a heated game of Bear Island rummy, although in the early '60s the Reverend Sandor Farkas, a long-time summer resident, discovered chanterelles growing in the shadow of the island's pine, birch, and oak trees, thereby establishing a new summer

Homesick? Lonesome?

Join Table 16 in the Camp Nokomis dining hall, stick a spoon on your face, and learn a new song. You'll never want to go home.





sport—mushroom hunting. Things have turned so competitive that nowadays if some neighbors spot a clutch of mushrooms too small for picking, they cover them with leaves to safeguard the location.

Why come to Bear Island? For the girls of Camp Nokomis, it is the promise of archery, canoeing, camp songs, and, of sensing, as Maureen Corsetti, a counselor, explained, “the possibility of what can be.”

“It’s about finding a place to belong and friendships,” said Lisa Honeyman, who has attended camp as a camper, then as staff and volunteer, since 1972.

“When things aren’t going right, I crave this,” she said, looking out over the lake. A breeze ruffled the water; sailboats skimmed the surface. “At

Water ballerinas synchronize their moves in Lake Winnepesaukee (above). About a mile down shore, sailors at Camp Lawrence for boys air out in the wake of a lesson.



03246

RESIDENT BEARS: 0
ICE CREAM SANDWICHES DELIVERED LAST SUMMER: 4,176
INCOMING AND OUTGOING MAIL: about 31,000 pieces
FAMILY VISITS ALLOWED PER 48 HOURS: 1
NUMBER OF SONGS IN CAMP NOKOMIS SONGBOOK: 189
HOMESICK KIDS WHO LEFT CAMP EARLY: 0



Transitions is a registered trademark of Transitions Optical, Inc. © 2002 Transitions Optical, Inc.

A SMART LENS provides comfort by getting light when it's dark and dark when it's light. A not-so-smart lens just sits there and does absolutely nothing.



Introducing the newest Transitions®: advanced lens technology that enables you to see clearly and comfortably in virtually any light condition.

Indoors, Transitions are as clear as your regular eyeglasses. But in outdoor light they darken as much

as necessary, even getting as dark as sunglasses. And Transitions provide 100% UV protection.



So tell your eyecare professional that you're interested in making Transitions your everyday glasses. And find out just how smart a lens can be.

Transitions®

Right in any light®

www.transitions.com

those times I just want to sit on a rock and look at the lake. When I'm not here, I do that in my mind."

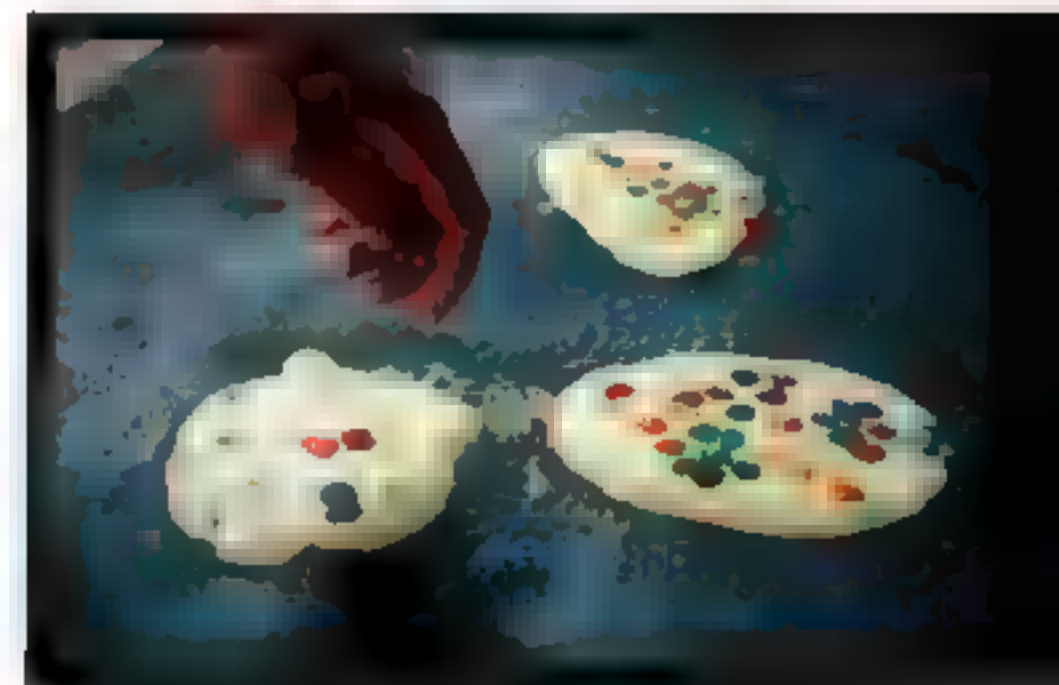
There is a time warp feel to Nokomis. It's always the summer of 1958, 1968, or whichever year you happened to be there first. You can return and find your way to the dining hall, lodge, or the Chippewa cabin where the youngest juniors reside—even if 25 years elapsed between visits. You still hear the slam of screen doors, the creak of the flag hoisted up the birch tree pole, the warble of the bugle blaring reveille. You still smell sweaty socks, campfire smoke, and the astringency of pine.

First as a counselor-in-training, then as a counselor, then for the past 25 years as director, Debbie Parker has been a part of Camp Nokomis, and has become the camp's center of gravity. When she celebrated her 50th anniversary with Camp Nokomis this past year, more than 300 alumnae showed up and showered such praise and affection on her as to bring a steady flow of tears to the eyes. "Because of Nokomis, whenever I catch a whiff of balsam my heart goes home. I feel centered," one alum wrote.

A good summer camp is a community. That Nokomis and Camp Lawrence are located on Bear Island, isolated from the mainland, makes them more so.

"This is a place of renewal, where one can drink in the silence," Debbie said one night as we sat on the dining hall porch and spoke about the

"It's about finding a place to belong and friendships."



Lawrence boys take a post-lunch slesta. Says director **Debbie Hetherly**, kids "need downtime." They also need sugar. Pushing the limits of the candy ration, Nokomis girls prepare a house specialty: M&M pancakes.

choices we make in life—whether that choice is to grow up to become a doctor, lawyer, or camp director. Debbie's only son, Jimmy, made some bad choices. For 25 years he struggled with drug and alcohol addiction. Six months before Debbie and I sat and talked, just before Christmas, Jimmy died from cardiac arrest. He was 40 years old. Debbie intended to address the subject of choices at camp chapel on Sunday. "I will say that we make choices, and they determine the direction of our life. I think if I speak about my son it will have integrity."

I told her I admired her courage. "How unbearably sad to have had such a positive effect on so many children, yet be unable to save your own child," I said. "I don't know the answer to that," she replied. "He finally began to have a sense of who he was. Before he died, he said he was

AFTER DIANE KASTAMA
 LOST THE USE OF HER TWO LEGS,
she gained
 THE STRENGTH OF FOUR.

An alarm clock buzzes. A horse outside whinnies. And a dog's lifework continues. Though never trained to help out on a horse ranch, this canine companion has made herself invaluable. Whether corralling horses, pulling her owner up a hill or just closing a door, she uses the full capacity of her



who relies on her total body health to do her job. Which is why her owner feeds her Eukanuba.[®] The only dog food with the Vital Health

System. By targeting six essential health functions of every dog, the Eukanuba Vital Health System[™] delivers nutrients when and where they're needed for optimal health [see graphic].



All Eukanuba foods incorporate the Vital Health System, with unique formulas customized to meet the specific needs of different life stages.

Look for Eukanuba in specialty pet stores. Or call 1-888-EUKANUBA to find out more. Because the Vital Health System not only means better health for dogs, but also for the people who count on them.

THE EUKANUBA[®] VITAL HEALTH SYSTEM[™]
 Targeted Nutrition For Optimal Health Every Day.

The diagram shows a dog's body with six health functions highlighted by icons: Skin & Coat Health (brush), Sensory/Mental Health (flower), Bone & Muscle Health (bone), Digestive Health (stomach), Vital Organ Health (heart), and Oral Health (teeth).

mind and body from dawn to dusk. All the while, making the term "confined to a wheelchair" absolutely irrelevant. Meet Fritzie. An eight-year-old Yellow Lab



grateful that his father and I never turned our back on him. He always knew we loved him.” She paused. “People say to me: ‘I can’t imagine what it’s like to lose a son,’ and I reply, ‘It’s true. You can’t.’”

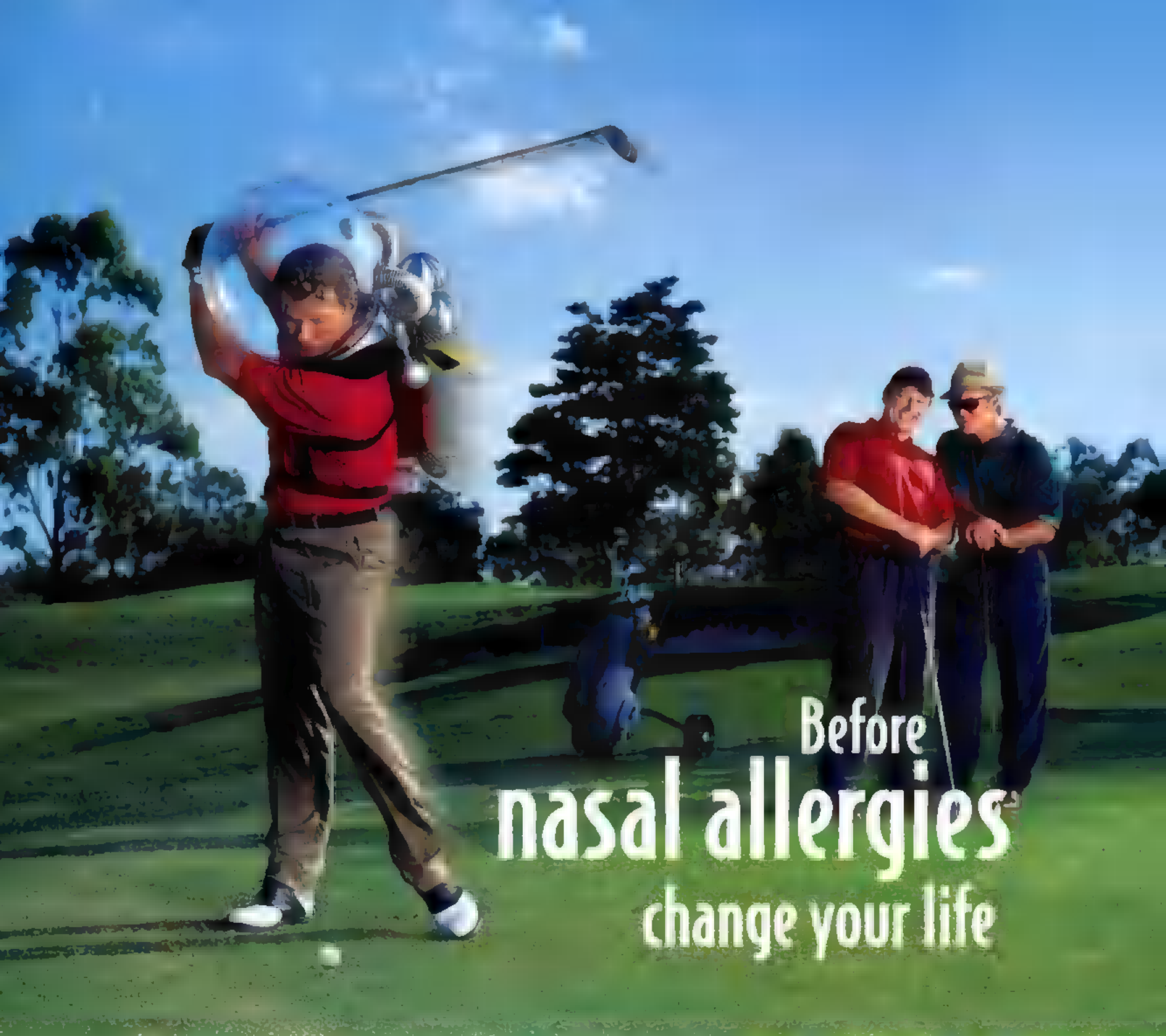
Some of Jimmy’s ashes are buried by the lakefront, at a spot marked by a wooden cross, and from there, on days when the haze lifts, you can see the peak of Mount Washington.

It was 9:30 and taps echoed across camp. “You know,” Debbie said, when I asked what made Bear Island special, “the loons will sing, the sun will go down, the lake will be like glass, and you can think about what’s important in life.” She went to the camp office to close up for the night. The haunting sound of a bugle lingered in the air. □

“OH MY GOD!” ■ 15-year-old shrieks when asked—by mail—to be a Lawrence boy’s girlfriend. Marle Federico, who sports her bra in typical Olympics Day fashion, says of camp, “You just get a lot more comfortable ■■■ yourself.”



ON OUR WEBSITE There’s more on 03246 ■ nationalgeographic.com/ngm/0208. Tell us why ■■ should cover **YOUR FAVORITE ZIP CODE** at nationalgeographic.com/ngm/zipcode/0208 or mail your suggestion to PO Box 98199, Washington, DC 20090-8199. E-mail: zip@nationalgeographic.com



Before
nasal allergies
change your life

Make
an easier
Change



Coping with the handicap of nasal allergies can get really frustrating.

Of course, you would never go to these extremes. But before you change your life, maybe you should make an easier change. Ask your doctor about FLONASE.

Using multi-symptom FLONASE Nasal Spray once a day can relieve all these nasal allergy symptoms — congestion, sneezing, and itchy, runny nose — all day and night. Results may vary.

If side effects occur, they are generally mild, and may include headache, nosebleed, or sore throat. For best results, use daily. Maximum relief may take several days. Available by prescription only.

Ask your doctor about multi-symptom FLONASE, or call 1-800-FLONASE, or visit www.flonase.com.

When you get it all, all it takes is

Flonase[®]
(fluticasone propionate)
Nasal Spray, 50 mcg



GlaxoSmithKline

Please see important information on the following page.

FLONASE®
(fluticasone propionate)
Nasal Spray, 50 mcg

BRIEF SUMMARY

**SHAKE GENTLY
BEFORE USE.**

For Intranasal Use Only.

The following is a brief summary only; see full prescribing information for complete product information.

CONTRAINDICATIONS: FLONASE Nasal Spray is contraindicated in patients with a hypersensitivity to any of its ingredients.

WARNINGS: The replacement of a systemic corticosteroid with a topical corticosteroid can be accompanied by signs of adrenal insufficiency, and in addition some patients may experience symptoms of withdrawal, e.g., joint and/or muscular pain, lassitude, and depression. Patients previously treated for prolonged periods with systemic corticosteroids and transferred to topical corticosteroids should be carefully monitored for acute adrenal insufficiency in response to stress. In those patients who have asthma or other clinical conditions requiring long-term systemic corticosteroid treatment, too rapid a decrease in systemic corticosteroids may cause a severe exacerbation of their symptoms.

The concomitant use of intranasal corticosteroids with other inhaled corticosteroids could increase the risk of signs or symptoms of hypercorticism and/or suppression of the HPA axis.

Patients who are on immunosuppressant drugs are more susceptible to infections than healthy individuals. Chickenpox and measles, for example, can have a more serious or even fatal course in patients on immunosuppressant doses of corticosteroids. In such patients who have not had these diseases, particular care should be taken to avoid exposure. How the dose, route, and duration of corticosteroid administration affects the risk of developing a disseminated infection is not known. The contribution of the underlying disease and/or prior corticosteroid treatment to the risk is also not known. If exposed to chickenpox, prophylaxis with varicella zoster immune globulin (VZIG) may be indicated. If exposed to measles, prophylaxis with pooled intramuscular immunoglobulin (IG) may be indicated. (See the respective package inserts for complete VZIG and IG prescribing information.) If chickenpox develops, treatment with antiviral agents may be considered.

PRECAUTIONS:

General: Rarely, immediate hypersensitivity reactions or contact dermatitis may occur after the administration of FLONASE Nasal Spray. Rare instances of wheezing, nasal septum perforation, cataracts, glaucoma, and increased intraocular pressure have been reported following the intranasal application of corticosteroids, including fluticasone propionate.

Use of excessive doses of corticosteroids may lead to signs or symptoms of hypercorticism, suppression of HPA function, and/or reduction of growth velocity in children or teenagers. Physicians should closely follow the growth of children and adolescents taking corticosteroids, by any route, and weigh the benefits of corticosteroid therapy against the possibility of growth suppression if growth appears slowed.

Although systemic effects have been minimal with recommended doses of FLONASE Nasal Spray, potential risk increases with larger doses. Therefore, larger than recommended doses of FLONASE Nasal Spray should be avoided.

When used at higher than recommended doses, or in rare individuals at recommended doses, systemic corticosteroid effects such as hypercorticism and adrenal suppression may appear. If such changes occur, the dosage of FLONASE Nasal Spray should be discontinued slowly consistent with accepted procedures for discontinuing oral corticosteroid therapy.

In clinical studies with fluticasone propionate administered intranasally, the development of localized infections of the nose and pharynx with *Candida albicans* has occurred only rarely. When such an infection develops, it may require treatment with appropriate local therapy and discontinuation of treatment with FLONASE Nasal Spray. Patients using FLONASE Nasal Spray over several months or longer should be examined periodically for evidence of *Candida* infection or other signs of adverse effects on the nasal mucosa.

FLONASE Nasal Spray should be used with caution, if at all, in patients with active or quiescent tuberculous infection; untreated local or systemic fungal or bacterial, or systemic viral infections or parasitic infection; or ocular herpes simplex.

Because of the inhibitory effect of corticosteroids on wound healing, patients who have experienced recent nasal septal ulcers, nasal surgery, or nasal trauma should not use a nasal corticosteroid until healing has occurred.

Information for Patients: Patients being treated with FLONASE Nasal Spray should receive the following information and instructions. This information is intended to aid them in the safe and effective use of this medication. It is not a disclosure of all possible adverse or intended effects.

Patients should be warned to avoid exposure to chickenpox or measles and, if exposed, to consult their physician without delay.

Patients should use FLONASE Nasal Spray at regular intervals as directed since its effectiveness depends on its regular use. A decrease in nasal symptoms may occur as soon as 12 hours after starting therapy with FLONASE Nasal Spray. Results in several clinical trials indicate statistically significant improvement within the first day or two of treatment; however, the full benefit of FLONASE Nasal Spray may not be achieved until treatment has been administered for several days. The patient should not increase the prescribed dosage but should contact the physician if symptoms do not improve or if the condition worsens. For the proper use of the nasal spray and to attain maximum improvement, the patient should read and follow carefully the accompanying patient's instructions.

Drug Interactions: In a placebo-controlled, crossover study in eight healthy volunteers, coadministration of a single dose of orally inhaled fluticasone propionate (1000 mcg, 5 times the maximum daily intranasal dose) with multiple doses of ketoconazole (200 mg) to steady state resulted in increased mean fluticasone propionate concentrations, a reduction in plasma cortisol AUC, and no effect on urinary excretion of cortisol. This interaction may be due to an inhibition of the cytochrome P450 3A4 isoenzyme system by ketoconazole, which is also the route of metabolism of fluticasone propionate. No drug interaction studies have been conducted with FLONASE Nasal Spray; however, care should be exercised when fluticasone propionate is coadministered with long-term ketoconazole and other known cytochrome P450 3A4 inhibitors.

Carcinogenesis, Mutagenesis, Impairment of Fertility: Fluticasone propionate demonstrated no tumorigenic potential in mice at oral doses up to 1000 mcg/kg (approximately 20 times the maximum recommended daily intranasal dose in adults and approximately 10 times the maximum recommended daily intranasal dose in children on a mcg/m³ basis) for 78 weeks or in rats at inhalation doses up to 57 mcg/kg (approximately 2 times the maximum recommended daily intranasal dose in adults and approximately equivalent to the maximum recommended daily intranasal dose in children on a mcg/m³ basis) for 104 weeks.

Fluticasone propionate did not induce gene mutation in prokaryotic or eukaryotic cells in vitro. No significant clastogenic effect was seen in cultured human peripheral lymphocytes in vitro or in the mouse micronucleus test when administered at high doses by the oral or subcutaneous routes. Furthermore, the compound did not delay erythroblast division in bone marrow.

No evidence of impairment of fertility was observed in reproductive studies conducted in male and female rats at subcutaneous doses up to 50 mcg/kg (approximately 2 times the maximum recommended daily intranasal dose in adults on a mcg/m³ basis). Prostate weight was significantly reduced at a subcutaneous dose of 50 mcg/kg.

Pregnancy, Teratogenic Effects: Pregnancy Category C. Subcutaneous studies in the mouse and rat at 45 and 100 mcg/kg, respectively (approximately equivalent to and 2 times the maximum recommended daily intranasal dose in adults on a mcg/m³ basis, respectively) revealed fetal toxicity characteristic of potent corticosteroid compounds, including embryonic growth retardation, omphalocele, cleft palate, and retarded cranial ossification.

In the rabbit, fetal weight reduction and cleft palate were observed at a subcutaneous dose of 4 mcg/kg (less than the maximum recommended daily intranasal dose in adults on a mcg/m³ basis).

However, no teratogenic effects were reported at oral doses up to 300 mcg/kg (approximately 25 times the maximum recommended daily intranasal dose in adults on a mcg/m³ basis) of fluticasone propionate to the rabbit. No fluticasone propionate was detected in the plasma in this study, consistent with the established low bioavailability following oral administration (see CLINICAL PHARMACOLOGY section of full prescribing information).

FLONASE® (fluticasone propionate) Nasal Spray, 50 mcg

Fluticasone propionate crossed the placenta following oral administration of 100 mcg/kg to rats or 300 mcg/kg to rabbits (approximately 2 and 25 times, respectively, the maximum recommended daily intranasal dose in adults on a mcg/m³ basis).

There are no adequate and well-controlled studies in pregnant women. Fluticasone propionate should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Experience with oral corticosteroids since their introduction in pharmacologic, as opposed to physiologic, doses suggests that rodents are more prone to teratogenic effects from corticosteroids than humans. In addition, because there is a natural increase in corticosteroid production during pregnancy, most women will require a lower exogenous corticosteroid dose and many will not need corticosteroid treatment during pregnancy.

Nursing Mothers: It is not known whether fluticasone propionate is excreted in human breast milk. When tritiated fluticasone propionate was administered to rats at a subcutaneous dose of 10 mcg/kg (less than the maximum recommended daily intranasal dose in adults on a mcg/m³ basis), radioactivity was excreted in the milk. Because other corticosteroids are excreted in human milk, caution should be exercised when FLONASE Nasal Spray is administered to a nursing woman.

Pediatric Use: Five hundred (500) patients aged 4 to 11 years of age and 440 patients aged 12 to 17 years were studied in US clinical trials with fluticasone propionate nasal spray. The safety and effectiveness of FLONASE Nasal Spray in children below 4 years of age have not been established.

Oral and, to a less clear extent, inhaled and intranasal corticosteroids have been shown to have the potential to cause a reduction in growth velocity in children and adolescents with extended use. If a child or adolescent on any corticosteroid appears to have growth suppression, the possibility that they are particularly sensitive to this effect of corticosteroids should be considered (see PRECAUTIONS).

Geriatric Use: A limited number of patients above 60 years of age (n=275) have been treated with FLONASE Nasal Spray in US and non-US clinical trials. While the number of patients is too small to permit separate analysis of efficacy and safety, the adverse reactions reported in this population were similar to those reported by younger patients.

ADVERSE REACTIONS: In controlled US studies, more than 3300 patients with seasonal allergic, perennial allergic, or perennial nonallergic rhinitis received treatment with intranasal fluticasone propionate. In general, adverse reactions in clinical studies have been primarily associated with irritation of the nasal mucous membranes, and the adverse reactions were reported with approximately the same frequency by patients treated with the vehicle itself. The complaints did not usually interfere with treatment. Less than 2% of patients in clinical trials discontinued because of adverse events; this rate was similar for vehicle placebo and active comparators.

Systemic corticosteroid side effects were not reported during controlled clinical studies up to 6 months' duration with FLONASE Nasal Spray. If recommended doses are exceeded, however, or if individuals are particularly sensitive, or taking FLONASE Nasal Spray in conjunction with administration of other corticosteroids, symptoms of hypercorticism, e.g., Cushing's syndrome, could occur.

The following incidence of common adverse reactions (>3%, where incidence in fluticasone propionate-treated subjects exceeded placebo) is based upon seven controlled clinical trials in which 536 patients (57 girls and 108 boys aged 4 to 11 years, 137 female and 234 male adolescents and adults) were treated with FLONASE Nasal Spray 200 mcg once daily over 2 to 4 weeks and two controlled clinical trials in which 246 patients (119 female and 127 male adolescents and adults) were treated with FLONASE Nasal Spray 200 mcg once daily over 6 months. Also included in the table are adverse events from two studies in which 167 children (45 girls and 122 boys aged 4 to 11 years) were treated with FLONASE Nasal Spray 100 mcg once daily for 2 to 8 weeks.

Overall Adverse Experiences With >3% Incidence on Fluticasone Propionate in Controlled Clinical Trials With FLONASE Nasal Spray in Patients ≥4 Years With Seasonal or Perennial Allergic Rhinitis

	Vehicle Placebo (n=758) %	FLONASE 100 mcg Once Daily (n=167) %	FLONASE 200 mcg Once Daily (n=782) %
Headache	14.6	6.6	16.1
Pharyngitis	7.2	6.0	7.8
Epistaxis	5.4	6.0	6.9
Nasal burning/ nasal irritation	2.6	2.4	3.2
Nausea/vomiting	2.0	4.8	2.6
Asthma symptoms	2.9	7.2	3.3
Cough	2.8	3.6	3.8

Other adverse events that occurred in <3% but ≥1% of patients and that were more common with fluticasone propionate (with uncertain relationship to treatment) included blood in nasal mucus, runny nose, abdominal pain, diarrhea, fever, flu-like symptoms, aches and pains, dizziness, bronchitis.

Observed During Clinical Practice: In addition to adverse events reported from clinical trials, the following events have been identified during postapproval use of fluticasone propionate in clinical practice. Because they are reported voluntarily from a population of unknown size, estimates of frequency cannot be made. These events have been chosen for inclusion due to either their seriousness, frequency of reporting, causal connection to fluticasone propionate, occurrence during clinical trials, or a combination of these factors.

■ **Hypersensitivity reactions,** including angioedema, skin rash, edema of the face and tongue, pruritus, urticaria, bronchospasm, wheezing, dyspnea, and anaphylaxis/anaphylactoid reactions, which in rare instances were severe.

Ear, Nose, and Throat: Alteration or loss of sense of taste and/or smell and, rarely, nasal septal perforation, nasal ulcer, sore throat, throat irritation and dryness, cough, hoarseness, and voice changes.

Eye: Dryness and irritation, conjunctivitis, blurred vision, glaucoma, increased intraocular pressure, and cataracts.

OVERDOSAGE: Chronic overdosage with FLONASE Nasal Spray may result in signs/symptoms of hypercorticism (see PRECAUTIONS). Intranasal administration of 2 mg (10 times the recommended dose) of fluticasone propionate twice daily for 7 days to healthy human volunteers was well tolerated. Single oral doses up to 16 mg have been studied in human volunteers with no acute toxic effects reported. Repeat oral doses up to 80 mg daily for 10 days in volunteers and repeat oral doses up to 10 mg daily for 14 days in patients were well tolerated. Adverse reactions were of mild or moderate severity, and incidences were similar in active and placebo treatment groups. Acute overdosage with this dosage form is unlikely since one bottle of FLONASE Nasal Spray contains approximately 8 mg of fluticasone propionate.

The oral and subcutaneous median lethal doses in mice and rats were >1000 mg/kg (>20000 and >41000 times, respectively, the maximum recommended daily intranasal dose in adults and >10000 and >20000 times, respectively, the maximum recommended daily intranasal dose in children on a mcg/m³ basis).

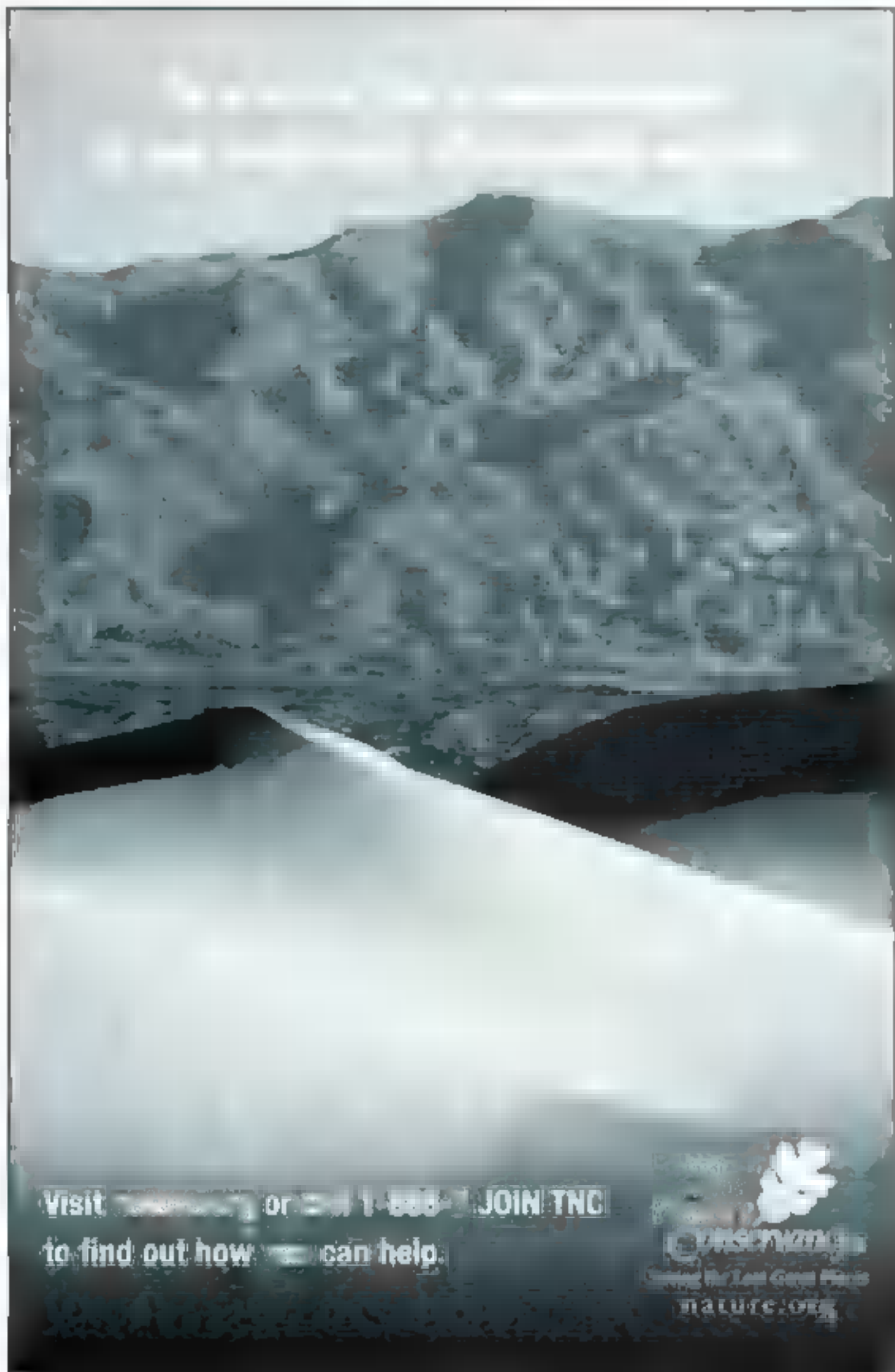
GlaxoWellcome

Glaxo Wellcome Inc.
Research Triangle Park, NC 27709
©Copyright 1997, Glaxo Wellcome Inc. All rights reserved.
U.S. Patent 4,335,121
INSEAL™ is covered by the following Inprint Systems
patent applications: European 94916311.7, Canada 2140025, USA 08/373,213.

October 2000

RL-868

GLA-01-12BA BS



Visit www.nature.org or call 1-888-7-JOIN-TNC
to find out how you can help.



AUTHORS WANTED

A well-known New York subsidy book publisher is searching for manuscripts. Fiction, non-fiction, poetry, juvenile, travel, scientific, specialized and even controversial subjects will be considered. If you have a book-length manuscript ready for publication (or are still working on it), call or write for informative, free 32-page booklet "TD-7."

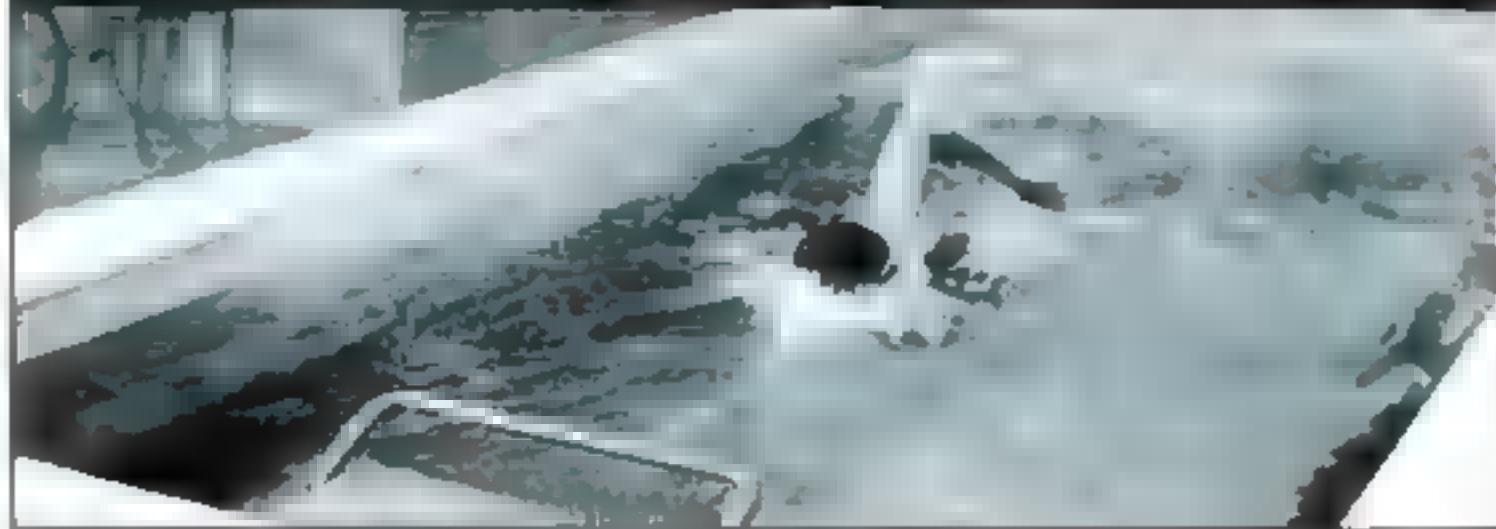
VANTAGE PRESS, INC.

516 W 34th St., New York, NY 10001

Phone: 1-800-821-3990

www.vantagepress.com

Swim At Home™



Swim ■ exercise against ■ smooth current adjustable to any speed ■ ability. Ideal for swimming, water aerobics, rehabilitation and fun.

FOR FREE VIDEO CALL
(800) 233-0741, Ext. 2308
www.endlesspools.com



Enter a South Africa few outsiders see.

Peace Corps volunteer Jason Carter's unique experience of living with a black family in rural South Africa reveals the dichotomy of a black, Third-World country and a white, First-World country in a society striving to transcend its history of apartheid and heal wounds. This powerful and timely volume offers hope that even such a fragmented society can come together and triumph.

Introduction by JIMMY CARTER

POWER

JASON CARTER



Two Years on SOUTH AFRICA'S Borders

INES

"In POWER LINES, Jason Carter writes insightfully of strength, commitment, and idealism—his own as well as that of the many South Africans whose stories he tells."

—Archbishop Desmond Tutu

"Jason Carter's Peace Corps experience reminds me that to know Africa is to know its people in their villages..."

—Ambassador Andrew Young

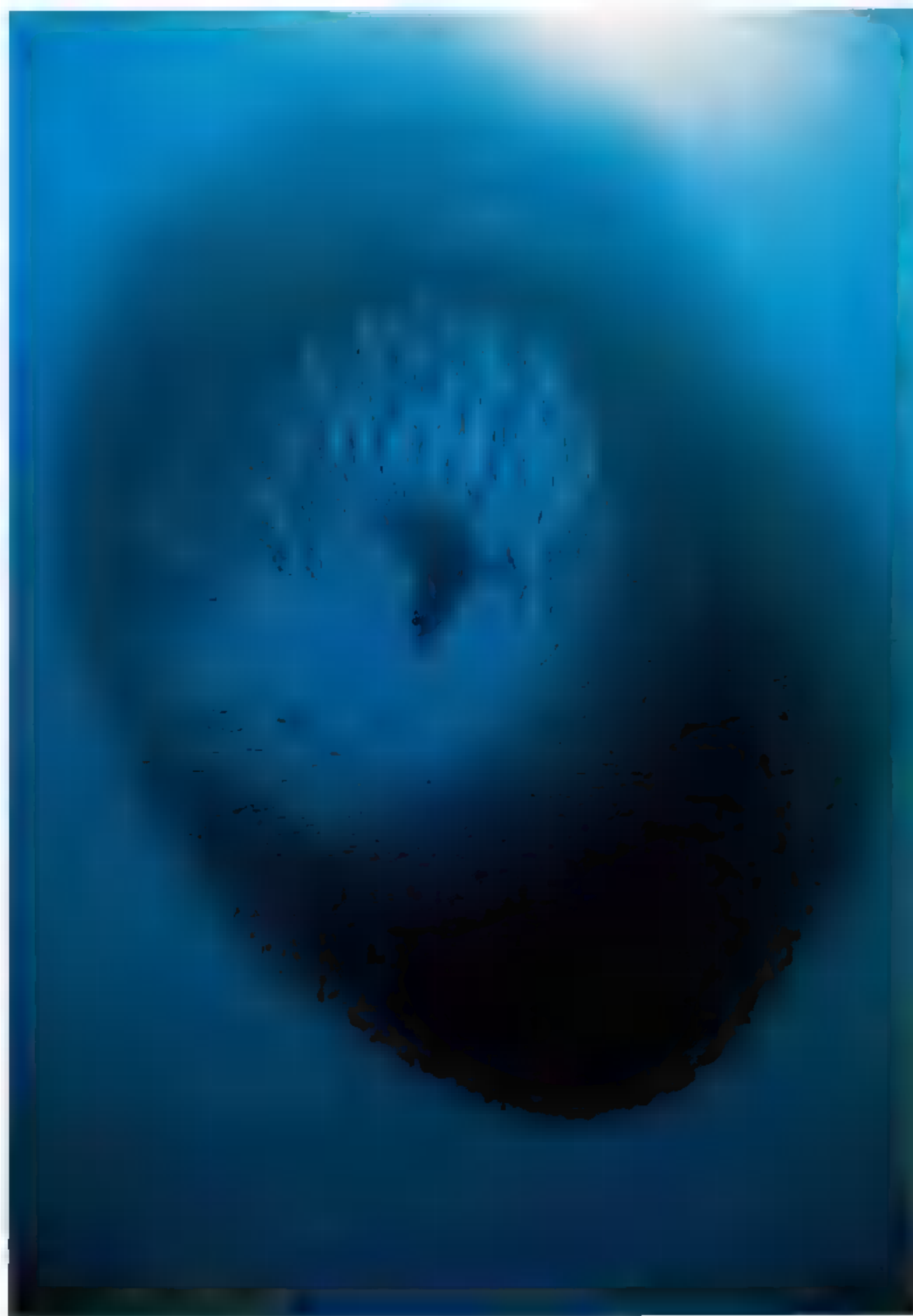
"South Africa is a magnificent and troubled country. In Jason Carter, it now has a fine and powerful writer to tell its story. A grandson of an American President, he writes with the sure confidence of an adopted son of the Swazi people."

—Chris Matthews, NBC News

Available wherever books are sold or call 1-888-647-6733.
\$26 • 304 pages • 8 page photo insert • ISBN 0-7931-8947-1



Final Edit



DAVID DOUBILET

OCEANS OF PLENTY

The Last Roundup

When sardines race up South Africa's east coast in massive shoals, dolphins corral them into bait balls, allowing opportunistic seals and sharks to smash through with jaws snapping. Ultimately the shark picture on pages 2-3 was chosen over this poetic image of a seal. "There's a quiet menace to the shark picture that worked better with the story," says Illustrations Editor Kathy Moran.

MORE ON OUR WEBSITE

Cut it or keep it? Find out what tipped the balance for this photo and send it as an electronic greeting card at nationalgeographic.com/ngm/0208.

Mother Nature's Energy Mix



*↳ Mother Nature's Energy Bar
The only 100% natural trail mix bar made
with fruit and nuts and whole grain puffs.
The Energy Bar Nature fills you up.*



GOVERNMENT



GOVERNMENT



BRAZIL

Watch Your Step

The flames look ominous, but to **David Alan Harvey**, there was a scarier part of photographing sugarcane cutters in Bahia: poisonous snakes. "The cutters burn cane in the afternoon to make it easier to cut the next day, and the fire causes the snakes to come out," David says. "There's one guy in the crew whose job it is to kill snakes. He whacks them with a machete and flips them into the fire."

David spotted only a few of

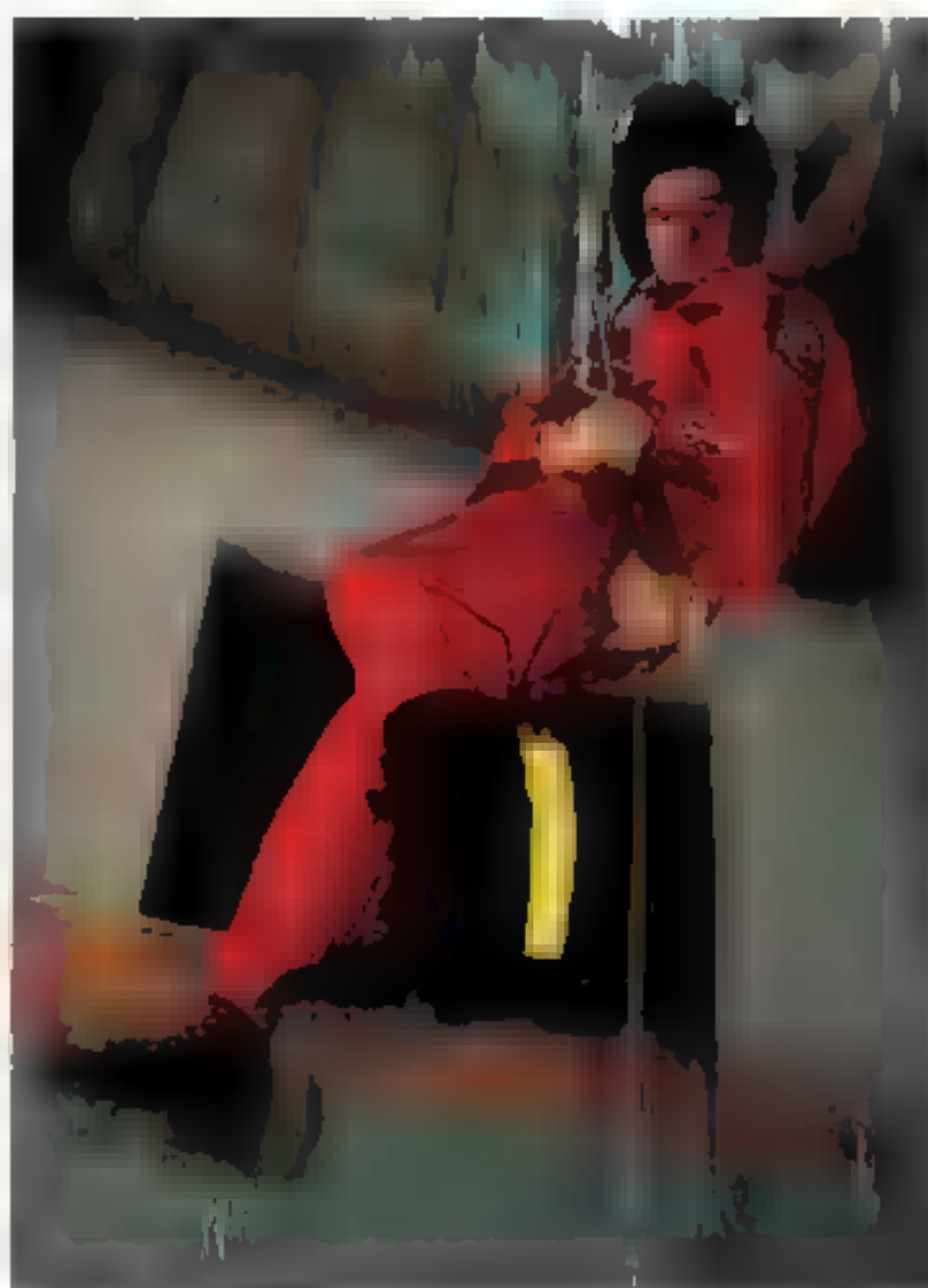


YURI ALMEIDA

the four-foot-long snakes out of the corners of his eyes as he worked. "When you're looking through the camera's viewfinder, you don't pay any attention," he says. "You're thinking about the

picture." The cane cutters wore long pants and boots; David arrived clad in the shorts and sandals he had worn earlier on Bahia's coast. "I don't know what I was thinking," he admits.

WORLDWIDE



NGS PHOTOGRAPHER: MARK THIESSEN

He looks like a big red yo-yo, thought photographer **Mark Thiesen** as he watched author **Glenn Hodges** dropping down ■ rappelling rope (above) at the Provincial Rapattack Operation Center in British Columbia. The Rapattack Center gave the pair ■ four-day course in rappelling from a helicopter to prepare them for their article on Russian smokejumpers. Glenn and Mark began on ■ 10-foot indoor platform, worked up to ■ 60-foot tower, and eventually made their way half a dozen times down ropes from a helicopter hovering

200 feet above the ground. "It was a little bit hairier going out of the helicopter," Glenn explains. "It's noisy, it's windy, and it's ■ tight squeeze between the helicopter's body and its skids. But it wasn't nearly ■ scary as you'd think."

Mark's training came in handy when he found himself dangling from ■ Russian helicopter, his rope stuck in its metal rappelling brake. He recalls thinking, before I panic, let's ■ if I can work out of this situation. He hand-fed the rope through the device until the snag cleared, then rappelled down. "It probably took about 30 seconds, but it seemed a lot longer," he says.


Kennedy Warne was thrilled to dive with sharks and dolphins off the coast of South Africa, but if you really want to get him excited about marine life, ask him about the subject of his master's thesis: sponges. "A lecturer in invertebrate zoology made sponges sound so fascinating, I was unable to resist," he says. Twenty-four years after the publication of "A Systematic Study of the Haplosclerida of

New Zealand," he's editor of *New Zealand Geographic*. "I gave up science reluctantly," Kennedy says, "but now I write about the very things I left behind. I can't imagine ■ more satisfying outcome."

Author **Tracy Dahlby** first climbed Mount Fuji in 1976 and remembers racing down from the summit with his companions, "yelling like idiots and sliding in the sand, one of those things you do when you're 26." Returning to Japan's landmark peak last year, he reached the summit again, but it took over five hours to descend on two bad knees. "I was elated to get to the top, but things had changed in 25 years," he admits. "I felt the ravages of age." The mountain, on the other hand, was in better shape. "In 1976 there was trash all over," Tracy says. "Now it looks more like you'd expect a national symbol to look."

▶ HEADLINE WEBSITE

Find more stories from our authors and photographers, including their best, worst, and quirkiest experiences, at nationalgeographic.com/ngm/0208.



WOULD IT SURPRISE YOU
TO KNOW AMERICA
COULD GROW MORE OF
ITS OWN FUEL?



Biofuels—fuels produced from plants—hold the potential to reduce our reliance on foreign oil. With plant biotechnology, American farmers can grow more corn, helping to produce more biofuels. Today, almost 2 billion gallons of ethanol—derived from crops like corn—serve as a renewable fuel that decreases automotive emissions and increases our energy supply. Millions of gallons of biodiesel fuel—made from soybeans—already power many buses and trucks. Plant biotechnology is a useful tool to help provide an abundant, affordable, and renewable fuel supply. If you want to learn more, we invite you to call or visit our Web site.

WWW.WHYBIOTECH.COM
1-800-980-8660

Biotech
Corn

COUNCIL FOR
BIOTECHNOLOGY
INFORMATION



good ideas are growing

Flashback



AP/WIDE WORLD PHOTOS

RUSSIAN SMOKEJUMPERS

Smoke Thumpers

Volunteers beat back flames caused by a careless camper near Madison, Tennessee, during the drought of 1925. Their use of branches and burlap sacks to fight the fire—especially when water was scarce— isn't so strange, according to John Ragsdale, a Nashville fire district chief. "I've used brooms too," he says. "You can just sweep that kind of fire out sometimes." And if the bristles burn? "You get yourself a new broom," he shrugs.

Brush fires are less common in the region these days. Now that Madison has been absorbed into suburban Nashville, there's not much brush left.

This photo has never before been published in the magazine.

MORE ON OUR WEBSITE

You can send this month's Flashback as an electronic greeting card and access the Flashback photo archives at nationalgeographic.com/ngm/flashback/0208.

WE HAVE THE SAME HEROES.
TEACHERS WHO INSPIRE.
WE LIVE WHERE YOU LIVE.™



*Catherine Roberts
Good Neighbor Teacher
Award® Winner*

Through her Oyster Restoration Project, Catherine Roberts' class works with scientists and environmentalists to improve the quality of local waterways. We're proud to present her with the Good Neighbor Teacher Award and to make a donation of \$10,000 in her name to the W. E. Waters Middle School in Portsmouth, Virginia.

LIKE A GOOD NEIGHBOR



STATE FARM IS THERE.™

statefarm.com*

State Farm Insurance Companies • Home Offices: Bloomington, Illinois

IF YOU CAN, MAYBE YOU WILL.



THE NEW H2. **HUMMER**® LIKE NOTHING ELSE™

HUMMER.COM

For more information call 1.800.REAL.HUMMER. © General Motors Corporation, 2002. HUMMER and the vehicle's grille design are registered trademarks of General Motors Corporation. HUMMER is a proud partner of Ford's F150®. Hum